JUL 23 1948

Textile Industries

JULY, 1948

formerly COTTON Textile Industries

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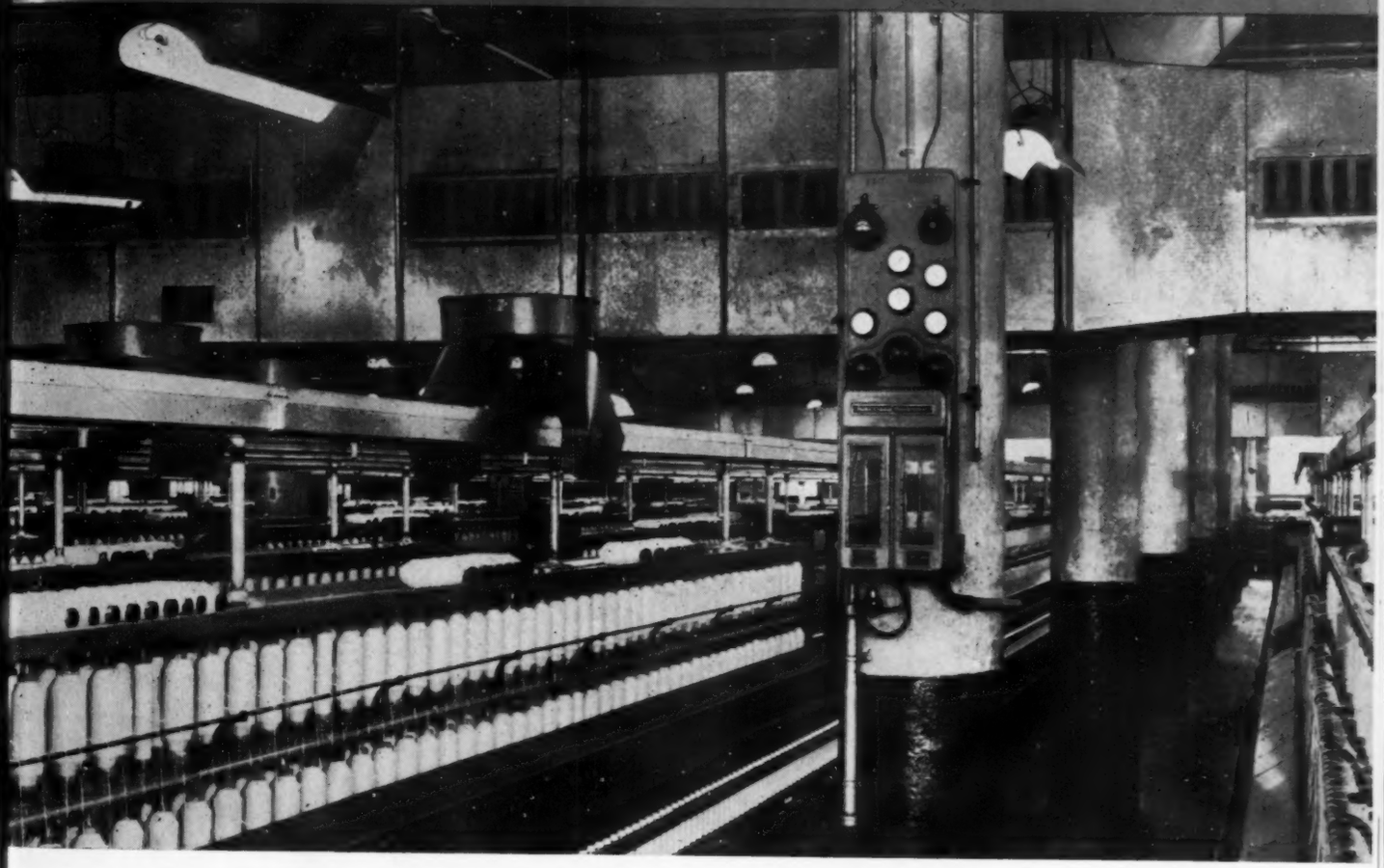

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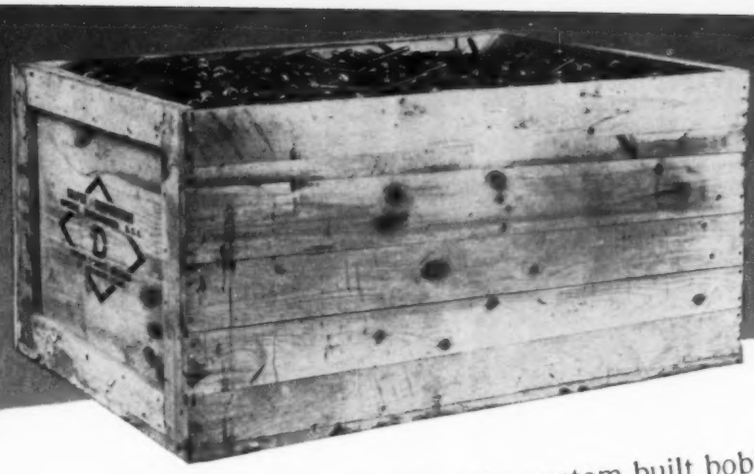
TEXTILE INDUSTRIES is published monthly at 116 E. Crawford St., Dalton, Ga., by W. R. C. Smith Publishing Company, Dalton and Atlanta, Ga., U. S. A. Executive and Editorial Offices: Grant Bldg., Atlanta 3, Ga.
Subscription Rates, United States and Possessions, $2.00 for one year; Canada, South America, Central America, $2.00 per year; Foreign Countries, $5.00 per year. Entered as second-class matter at the Post Office, Dalton, Ga., under the Act of March 3, 1879.

Volume 112 Number 7



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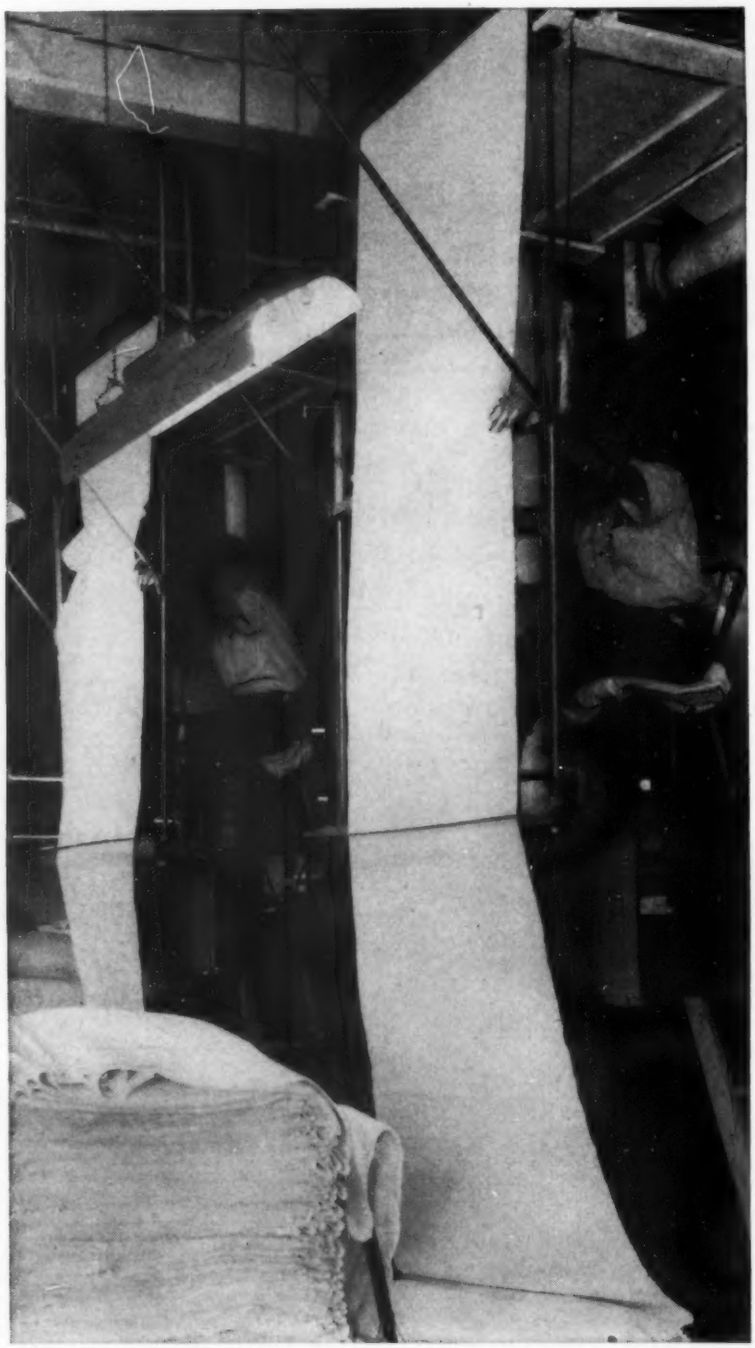

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Volume 112, Number 7

Textile Industries

July, 1948

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"Textile Industries" has the largest circulation among the mills of the United States of any textile publication.

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U. S., CANADA, PAN-AMERICA—$2.00
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Published Monthly at 115 E. Gordon, Dalton, Ga.

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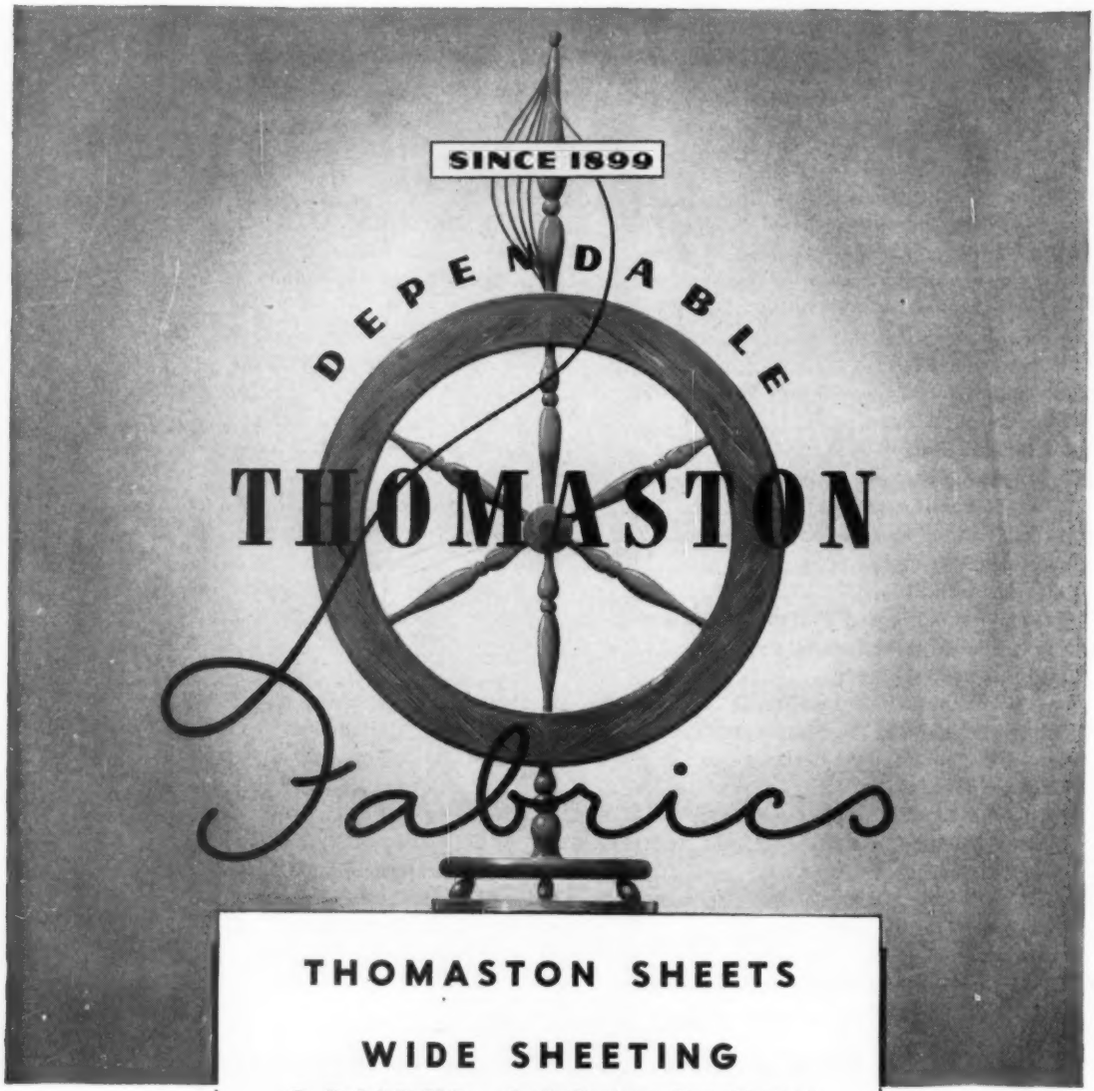

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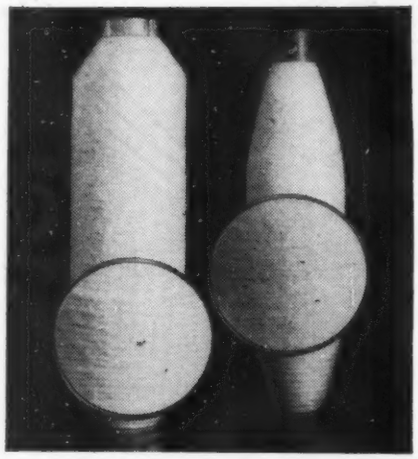
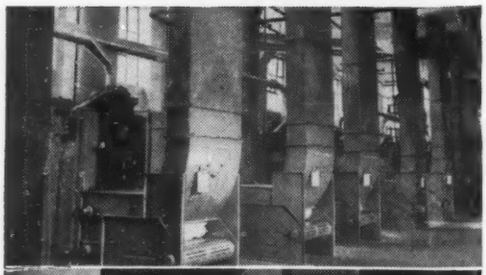
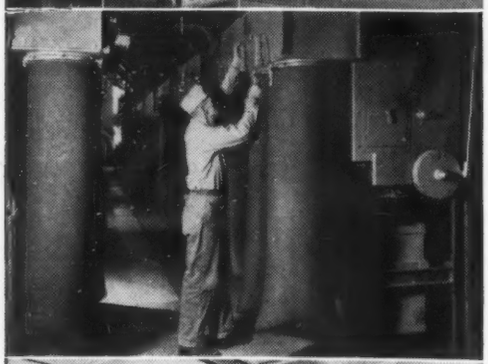
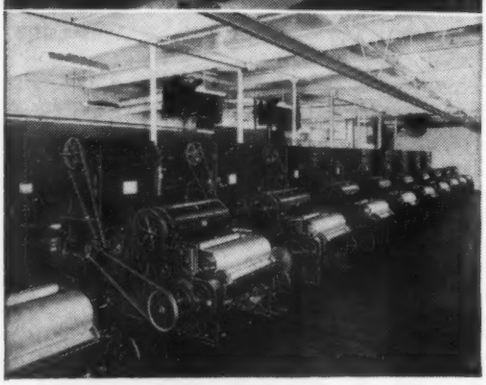


Impurities and defects in the yarn or thread inevitably follow insufficient cleaning and poor opening. These defects can be reduced to the minimum by using "1948 SACO-LOWELLized" Opening and Picking Processes.

SACO-LOWELL ..always FIRST in Opening, Cleaning, Picking







Modern opening and picking is built around six major developments *pioneered by SACO-LOWELL:*

1. Cleaning and Blending Feeders
2. Dust and Waste Extractors
3. Reserve Box with Control Distribution
4. One-Process Picking with Blending Reserve
5. Automatic Air Filters for Picker Room
6. Synchronized Electric Control for Opening and Picking

All originated by SACO-LOWELL, these notable engineering achievements have saved vast sums through better cleaning, more uniform blending, reduced fibre damage, and regularity in weight and lap structure.

Removal of Impurities such as peppery leaf, dust, seed fragments, motes and neps can best be accomplished in the opening and picking room... especially in a conditioned atmosphere made possible by the use of air recirculated through our automatic filters.

Today, with the ever-increasing use of cotton picked mechanically, the problem of *cleaning in the early stages* takes on added significance. Mills that have not had the opportunity to SACO-LOWELLize in recent years will find discussion with our engineers interesting and helpful.

(*Top*) Chutes from blending room to blending feeders
(*Center*) An impressive line of No. 6 Air Filters
(*Bottom*) Pickers in a large Southern mill

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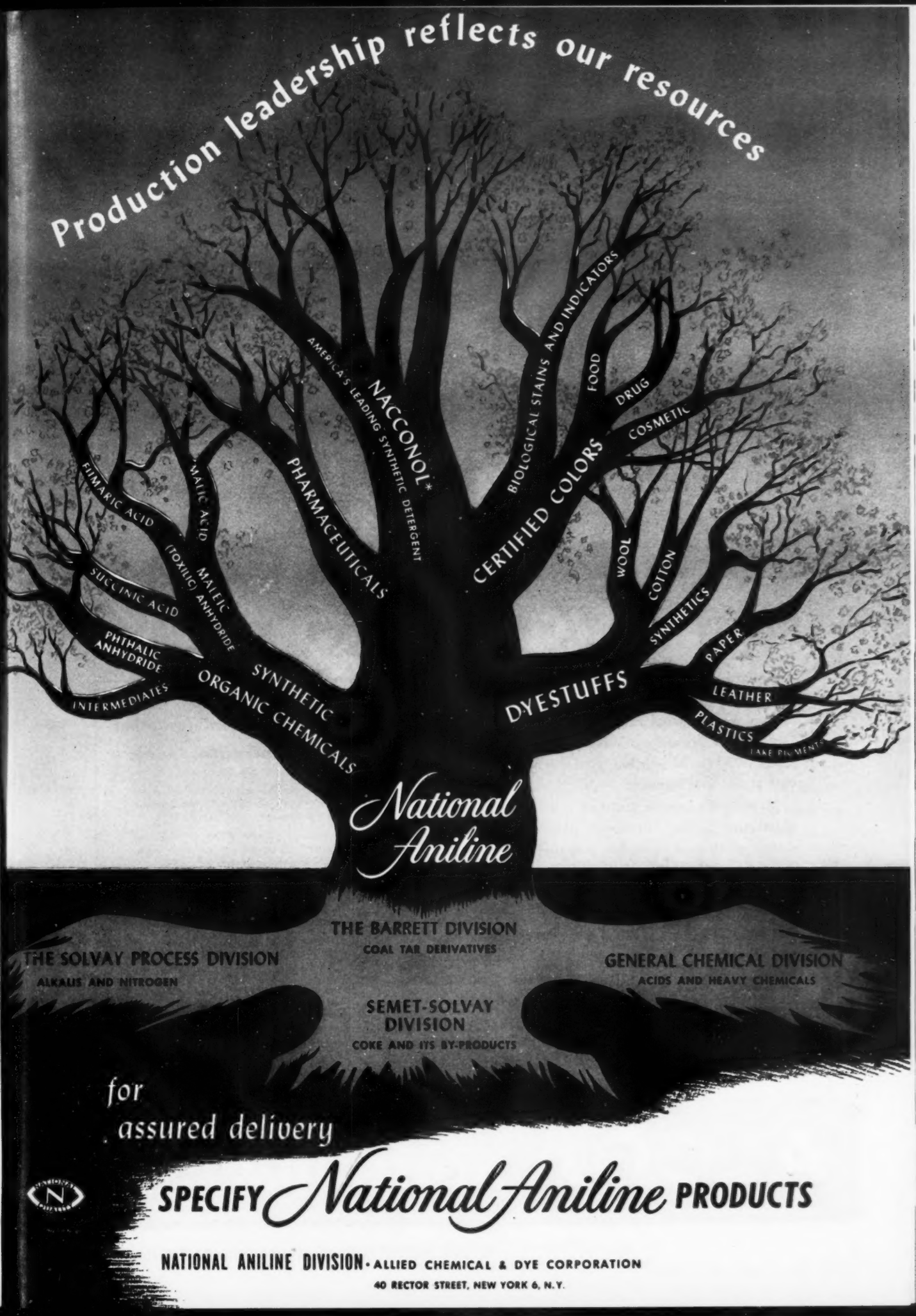
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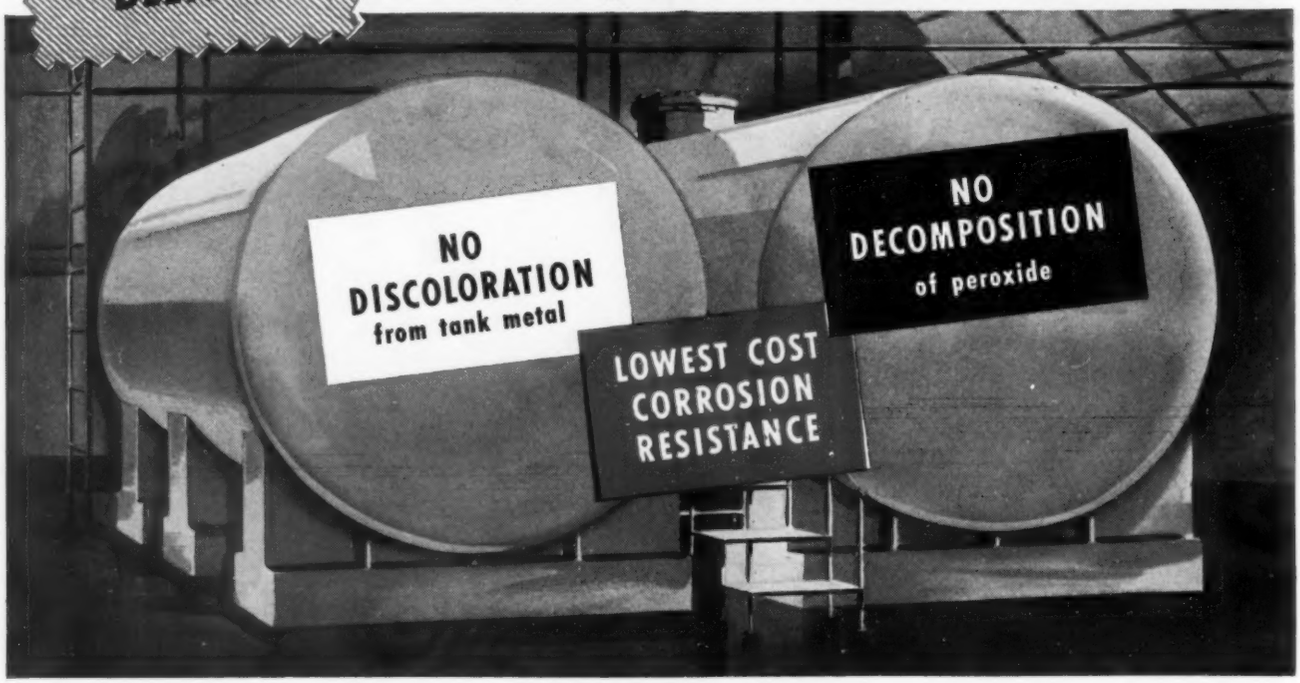

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Safeguard your continuous bleach process—store hydrogen peroxide in Alcoa Aluminum Tanks!

You avoid discoloration of bleach and yarn by tank metal corrosion. When peroxide is stored in tanks of Alcoa Aluminum, your yarn is safe from red rust stains and streaks.

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Tanks of Alcoa Aluminum are the lowest-cost, corrosion-resistant tanks you can buy. Inside and out, they're easier to keep clean.

Alcoa has the facilities and know-how to build peroxide tanks to your specifications—and deliver Alcoa-made tanks promptly. Or ask your tank builder to utilize Alcoa Aluminum and our engineering help in fabricating tanks. Call your nearby Alcoa sales office, or write ALUMINUM COMPANY OF AMERICA, 1473 Gulf Building, Pittsburgh 19, Pennsylvania.

Alcoa Aluminum for other mill operations, too!

Pipe and fittings of Alcoa Aluminum help keep peroxide at full strength, help prevent discoloration.

Slasher hoods of Alcoa Aluminum stay bright and clean, resist corrosion, don't discolor materials.

Separators for spinning frames and twisters help promote smoother operation because of decreased load on ring rails.

Warp beams and loom beams, new or replacement, are dimensionally stable, don't warp or splinter.

Here and dozens of other places Alcoa Aluminum can speed production, reduce waste, help you save money because it's strong, light in weight, corrosion-resistant.

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GOODYEAR

V-BELTS

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*y enhorabuena**!

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For 50 years, TEXTILE INDUSTRIES has brought to the nation's textile manufacturers sound technical information applicable to all the textile industries. It has provided a market place for manufacturers of textile machinery and supplies, augmenting their sales work and creating acceptance for their new developments. It has done this successfully for all concerned because it *talks the language of the trade* in clear, understandable terms and so has achieved the goal of all business journal publishers, which is to *talk the language* of the industry they serve.

And so we repeat, this time in English, "Greetings, friends, and hearty congratulations, and we add, "Best wishes for the future."

**In the Latin American textile mills, where Textiles Panamericanos is read, "enhorabuena" expresses congratulations.*

For almost 10 years, textile manufacturers in Mexico, Cuba, Central and South America, where textile manufacturing predominates the industrial scene, have been reading TEXTILES PANAMERICANOS (in Spanish). It is first choice by mill men because it talks their language. It is first choice, too, for advertisers who want their share of the profitable Latin American business.

TEXTILES *Panamericanos*

"talks their language" in Latin American textile mills

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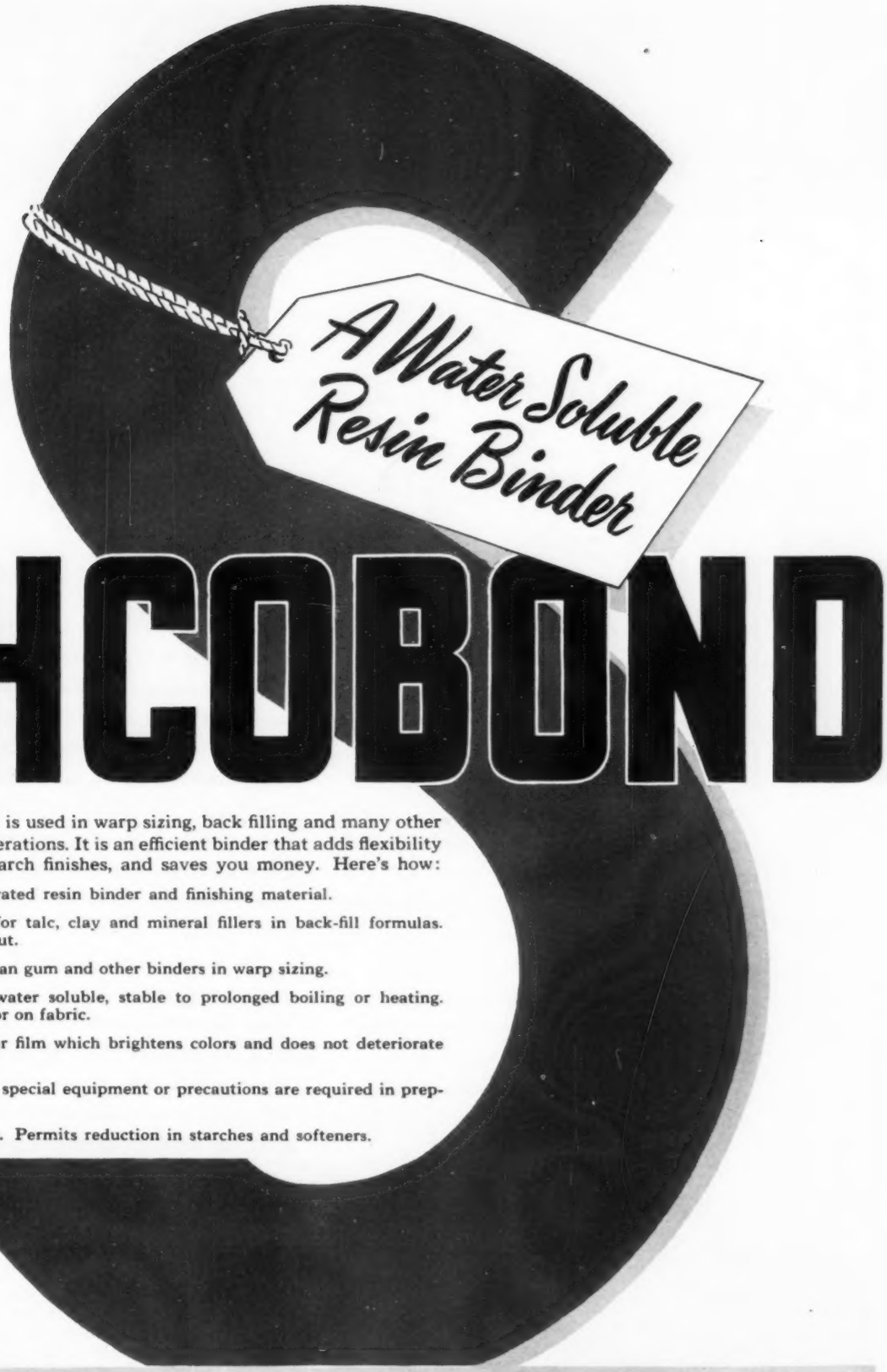

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J490 resists laps even when running wool or synthetics on cotton equipment

YOU can keep wool or synthetic fibers spinning smoothly on cotton system equipment when you use Armstrong's new J490 Accotex® Cots. They're made of a synthetic rubber specially compounded to resist top roll laps.

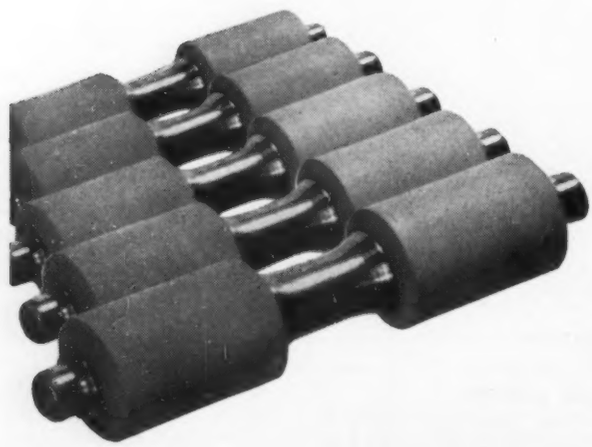
In drawing or roving, for example, fibers won't pull out of the sliver or roving and accumulate on the top roll when you use J490 cots. In spinning, Armstrong's J490 Accotex helps send broken ends down to the scavenger roll where they belong.

Long staple cottons draft well, too. Their long, wiry fibers tend less to curl up and wrap around a J490 roll.

Temperature and humidity changes don't affect the specially developed synthetic rubber used in the J490. This cot won't sweat in high humidity.

Besides being highly lap resistant, Armstrong's J490 Accotex Cots are exceptionally durable. Their tough synthetic rubber compound has a long initial life. And these cots can be rebuffed four or five times for extra service lives. Each buffing costs but a few cents per roll. For maximum freedom from eyebrowing, J490 cots should be used with revolving clearers.

Check the performance of Armstrong's J490 Accotex Cots on a test frame now. Your Armstrong representative will gladly help you arrange this test installation. Ask him for samples, prices, and additional information on this and other Accotex Cots. Or write to Armstrong Cork Company, Textile Products Dept., 3607 Arch Street, Lancaster, Pa.



CORK COTS
ACCOTEX APRONS
ROLL SHOP EQUIPMENT

J490 Accotex

NC-727 Accotex Cot serves more spindles than any other roll covering

ARMSTRONG'S NC-727, Accotex Cot is the most widely used general purpose roll covering because it spins high quality yarn consistently. It is used on work where a synthetic covering with long wear, better drafting, and maximum eyebrow-resistance are needed.

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NC-727 Accotex Cots maintain a good drafting surface longer than "straight" synthetic covers. And after a long initial service life, they can be rebuffed to a "like new" condition as many as five or six times. NC-727 Accotex Cots are unaffected by hard ends. They have good lap-resistance because they have little affinity for textile fibers, and are non-sweating under any mill condition.

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SOLVENT RESISTANCE—Accotex Cots are not affected by oil, water, dyes, or any of the commonly used textile solvents.

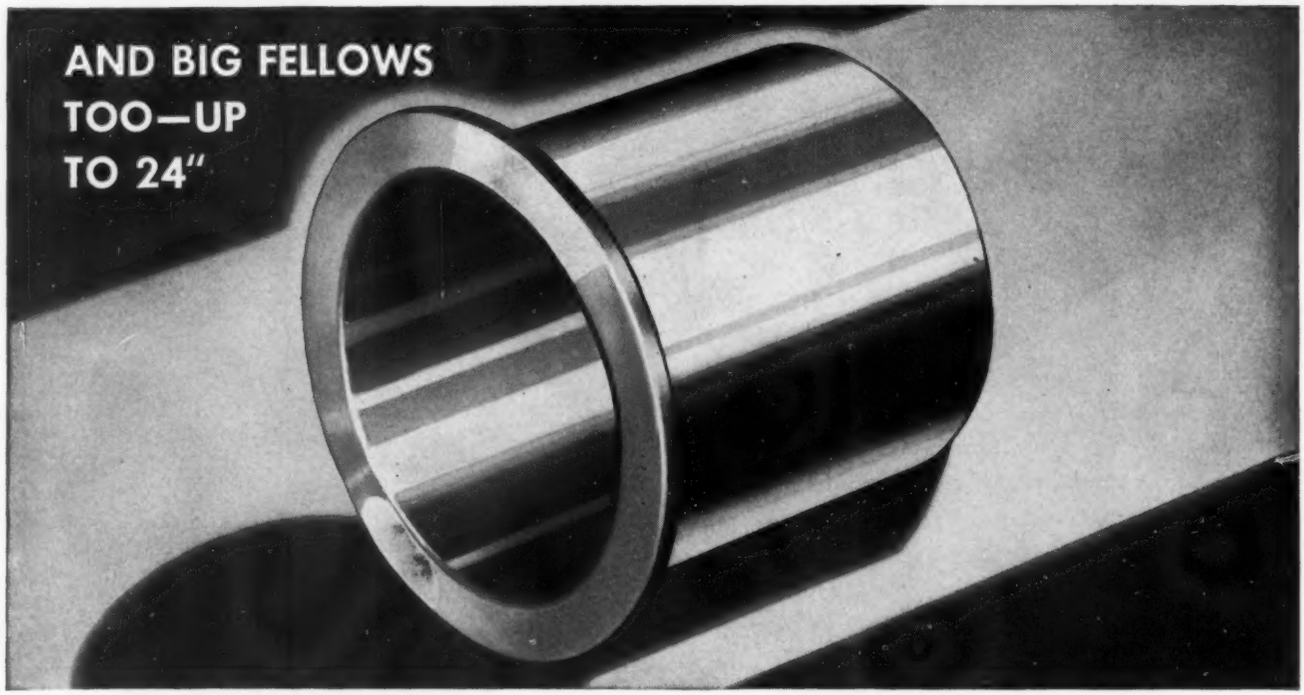
SEAMLESS CONSTRUCTION—Accotex Cots have no seams, no structural weakness to cause premature failure in service.

QUICK ASSEMBLY—Accotex Cots are ready glued for easier, quicker assembly.

ARMSTRONG'S ACCOTEX COTS

OILITE

THE *Oil Cushion* BEARING



. . . with Automatic Self-Lubrication

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OILITE is the heavy-duty OIL CUSHION Bearing built for surplus performance capacity necessary to meet unexpected emergencies. OILITE Bearings are used on all types of equipment from toy trains to heavy locomotives. They furnish metered lubrication without waste. Additional OILITE advantages are:

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- Representation in every state and Canada.
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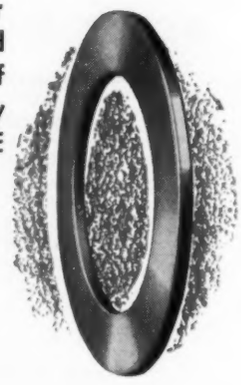
- Production tools for over 18,000 types and sizes.
- Large Bearings too—up to 24" diameter.
- And OILITE Bearings are not expensive.
- Mail us your blueprints. Address Department "M".



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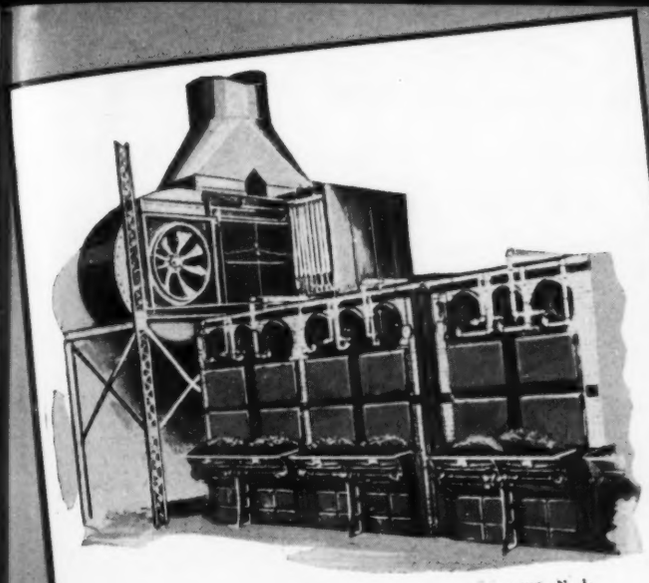
Division of Chrysler Corporation

FIELD ENGINEERS AND SUPPLY DEPOTS IN PRINCIPAL CITIES



BUFFALO INDUCED DRAFT PLANT AT HOBOKEN, N. J.

THE Buffalo Mechanical Draft System is the essential factor of advanced boiler practice. Is easily installed, flexible, positive and instantaneous. Makes feasible an increase of capacity without enlarging the boiler plant

ASK FOR BOOKLET CT.

BUFFALO FORGE CO.

ENGINEERS AND MANUFACTURERS.

BUFFALO. NEW YORK. CHICAGO.

CANADIAN BUFFALO FORGE CO., LTD., MONTREAL.

High Speed Engines. Fan System of Heating and Ventilating. Steel Plate Fans. Steel Pressure Blowers. Ld 1.

50 YEARS AGO

TEXTILE INDUSTRIES was called Cotton, and "BUFFALO" advertisements like this were keeping the industry informed on the latest and best developments in air equipment.

TEXTILE PLANTS WERE USING "Buffalo" FANS

and today...

"BUFFALO" keeps pace with the air needs of the amazing developments in the textile industries. Whether you need draft for better boiler performance . . . or exhausting or ventilation for positive quality control . . . you're certain of best results by specifying "BUFFALO". Call the "BUFFALO" engineer in any principal city, or write us about your air need.

BUFFALO FORGE COMPANY

175 MORTIMER STREET, BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Branch Offices in All Principal Cities

SOME PRESENT "BUFFALO" USERS INCLUDE:

Hoover Hosiery
Johnson City Mfg.
Griffin Hosiery
Harriman Hosiery
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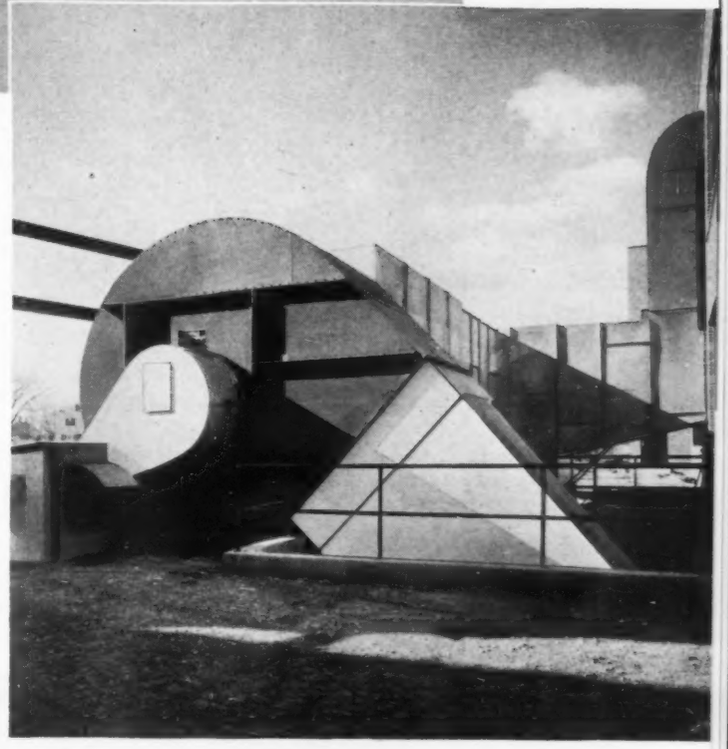
Classe Ribbon
Grey Hosiery
C. M. Mills & Co.
Avondale Mills
Judson Mills

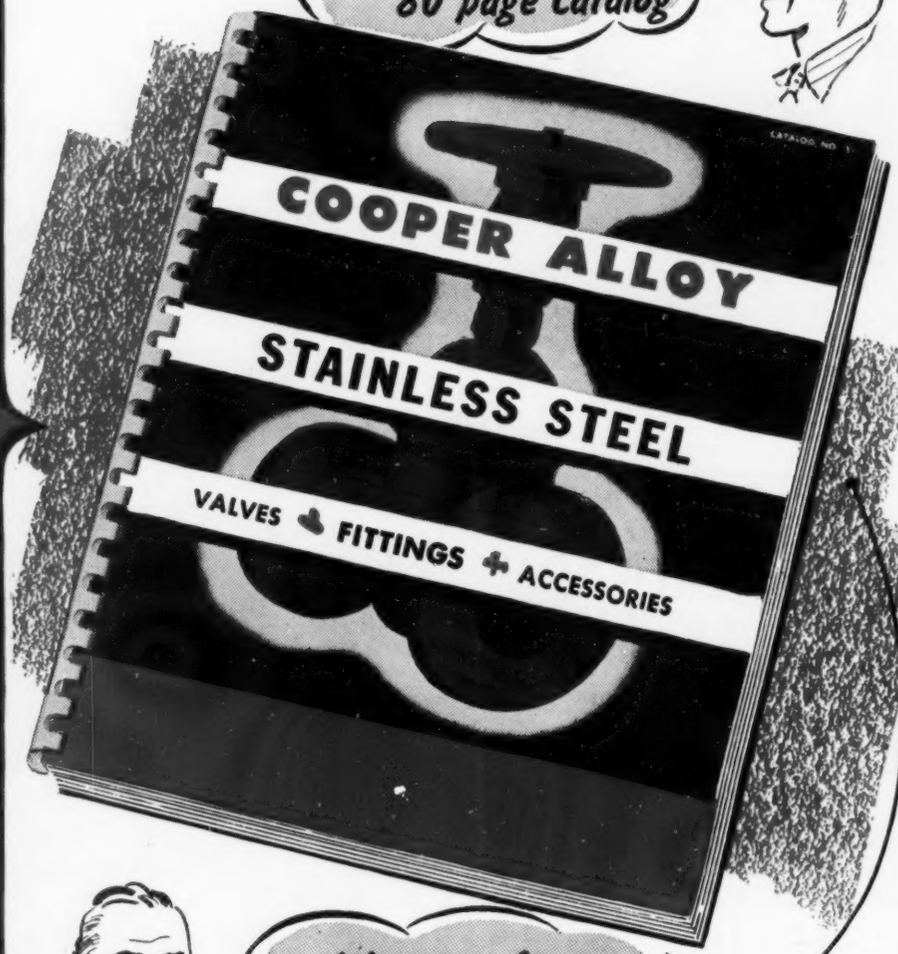


"BUFFALO" TYPE "LL" VENTILATING FAN

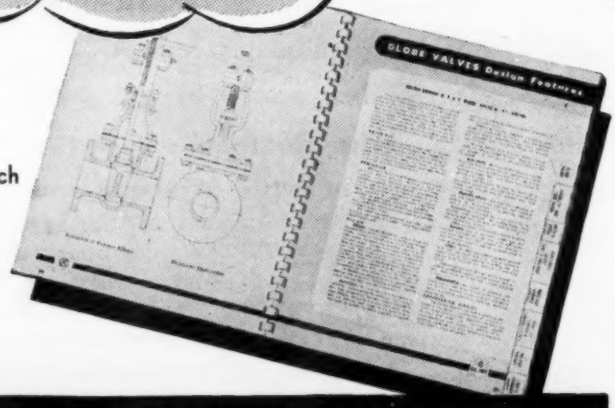
"Buffalo" FANS for the TEXTILE INDUSTRIES

IF YOU NEED CORROSION RESISTING VALVES FITTINGS and ACCESSORIES

you'll want this New, Complete, Concise, 80 page Catalog



It's yours for the asking!
WRITE FOR NEW CATALOG #51K



COOPER controls the production of these corrosion resisting products from design and casting to X-ray inspection and machining . . . for each step is performed on the more than three acres of plant facilities available to serve Cooper customers.

Est. 1922

SOLD THRU THE LEADING STAINLESS STEEL DISTRIBUTORS

Specialists in Corrosion Resisting Stainless Steel

THE COOPER ALLOY FOUNDRY CO.

HILLSIDE, NEW JERSEY

THEN, AS NOW, COLOR SOLD TEXTILES

Although the Spaniards, lusting for gold, crushed the Aztec Empire in 1519, the natives preserved a vestige of their culture in the products of their handiwork. As the centuries passed, their artistry became part of the Mexican heritage, until brilliant yarn dyed blankets and hangings were a permanent fixture in the homes of the wealthy grandees of New Spain. Then, as now, COLOR sold textiles.

Franklin Process

LARGEST PACKAGE DYERS IN THE WORLD

PROVIDENCE • PHILADELPHIA • GREENVILLE • CHATTANOOGA

New York Representatives, 40 Worth St.

STEADY TENSION—SMOOTH SIZING

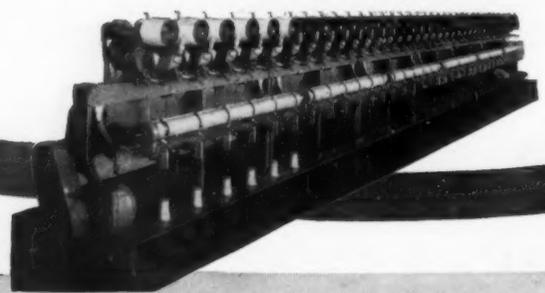
. . . ON THE FOSTER MODEL 76

Recent tensometer tests conducted on a coning machine at one Pennsylvania mill establish the smooth superiority of Foster Model 76 barrel wind packages as a coner supply. In no instance was there an observed tension variation of more than 1 gram in either direction while coning from packages wound by the Foster Model 76 with barrel wind attachment (see A above).

On the other hand, standard packages show a normal variation of 5 grams either direction (see B above). The Foster 76 winds fast, too, up to 2500 feet per minute, and the barrel wind package facilitates uniform steaming and drying.

Other outstanding features of the Foster 76 are:

1. **Ball bearing spindles for less power consumption and better mechanical performance.**
2. **Large cams that permit quieter machine operation.**
3. **Rigid construction that reduces vibration to a minimum.**



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WESTFIELD, MASSACHUSETTS

Southern Office: Johnston Building, Charlotte, N. C.; Canadian Representative: Ross-Whitehead & Co., Ltd., University Tower Building, 660 Ste. Catherine St. W., Montreal, Quebec; European Representative: Muschamp Taylor Ltd., Manchester, England

leading
designers
choose
wonderful
new fabrics
containing
the fiber

Lanese*

By Claire McCardell, a Renoir fabric

By Charles Lang, in Hafner's "Ponjula"

By Dartford Deb in Maxwell Frank's "Playfair"

By William Bass, a Berlinger fabric

The great mills of the country are incorporating the superior qualities of Celanese* Lanese synthetic staple fiber, into one handsome new cloth after another.

Fabrics containing a dominant proportion of Lanese possess a high degree of dimensional stability, which is vital in today's fashions. They have excellent draping qualities, a pleasing hand, versatility of weave and easy cleanability.

All fabrics shown here are woven at the Brighton Mills — McCampbell & Company, selling agents.

Celanese* Lanese*

SYNTHETIC STAPLE FIBER

*Reg. U. S. Pat. Off.

CELANESE CORPORATION OF AMERICA, 180 MADISON AVENUE, NEW YORK 16, N. Y.

Branch Offices: CAMDEN, N. J., 300 Broadway CHARLOTTE 2, 1106 Liberty Life Building BOSTON 10, 140 Federal Street

NOPCO PRESENTS

"UNISIZE"

AMAZING NEW 6-IN-1 SIZE FOR ACETATE AND VISCOSE RAYON WARPS

1 Product *6 Functions*

As a
1 Binder
2 Softener
3 Penetrant
4 Lubricant
5 Humectant
6 Defoamer

EASY TO USE—JUST MIX WITH WATER

"UNISIZE" is a *complete*, one-product size for Acetate and Viscose Rayon warps of all constructions . . . its unique, balanced properties provide advantages far surpassing those of conventional warp sizing compounds . . . its *simplicity, effectiveness* and *economy* have won unanimous and enthusiastic approval from users.

WHAT "UNISIZE" IS

"UNISIZE" is *chemically* a synthetic, proteinized, water-soluble polymer; *physically* a light tan free-flowing granulation—a single, *one-product* size which performs *six* essential sizing functions.

ADVANTAGES OF "UNISIZE"

SIMPLE, READY TO USE you waste no time predissolving *raw* materials . . . you need no complicated formulas. "UNISIZE"—*a model of simplicity*—affords the big advantage of a *single* product replacing the many complex mixes of the past. *Extremely soluble*, "UNISIZE" dissolves quickly and completely without gelling or lumping.

CLEAR-CUT FORMULATION you simply weigh the required amount of "UNISIZE" . . . 25 lbs. for Viscose warp, 50 lbs. for Acetate . . . and add it to 100 gallons of water heated to 180° F. Then, stir slowly for 8 minutes—run in quetch at 150° F.

EVEN DISTRIBUTION ON WARP in the quetch, there's no foaming, scumming or separation to prevent even distribution of the size on your warp. The warp comes off the last can without sandy hand—*smooth* and *firm*.

SUPERIOR BOND, FLEXIBLE FILM creating a *strong* bond, forming a *flexible, non-tacky* film, "UNISIZE" gives you maximum filament protection . . . eliminates taping . . . prevents sticking on drying cans.

ANTISTATIC PROPERTIES by preventing static during the *slashing* operation, "UNISIZE" eliminates banding. These same properties also reduce static during *weaving*.

UNIFORM SIZING "UNISIZE" will give you uniform sizing, warp after warp . . . the result of Nopco's rigid control through every step of its manufacture.

EASE OF BOIL-OFF "UNISIZE" scours out readily during normal boil-off procedure. No enzymes are required.

FINALLY, "UNISIZE" GIVES YOU FINER WARPS with smoother ends . . . *better* conditioned for *better* weaving. ECONOMICAL SIZING . . . on a performance basis, "UNISIZE" costs you far less than conventional sizing treatments . . . you'll save in both time and labor.

"UNISIZE" will solve your sizing problems. Send for a working sample today, or ask to have a Nopco representative run a trial in your mill soon. Write to:

NOPCO CHEMICAL COMPANY
2301 Essex St., Harrison, N. J.
(formerly National Oil Products Company)
Branches: BOSTON • CHICAGO • CEDARTOWN, GA. • RICHMOND, CALIF.

UNISIZE

6-IN-1 WARP SIZE FOR VISCOSE AND ACETATE

NOPCO EVOLVED THROUGH RESEARCH

MANUFACTURERS—
DISTRIBUTORS—
SELLING AGENTS—

ATTENTION!

Financing production and distribution with maximum efficiency, and at a minimum of risk, is best accomplished through the financial and credit checking services of a strong factoring organization.

Increased sales volume without increased fixed invested capital, accelerates turnover and should yield greater profits.

Write today for details.

John P. Maguire & Company
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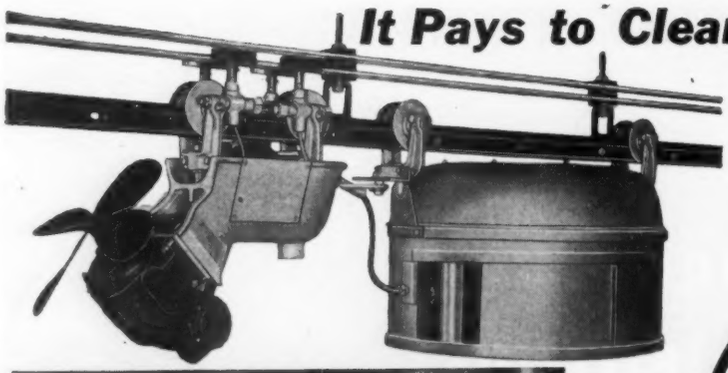
Check Credits • Cash Sales • Absorb Credit Losses

It Pays to Clean . . . . Automatically

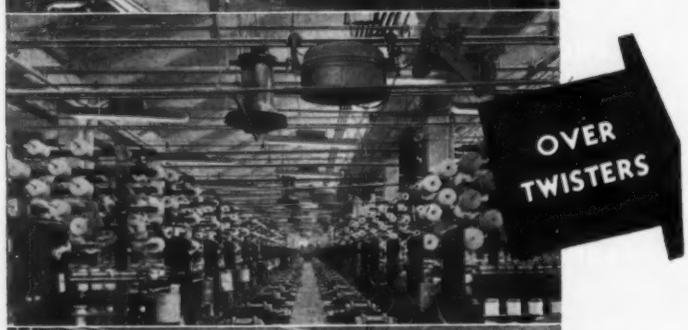
and you can do it better with

AMERICAN MONORAIL

Automatic Cleaners

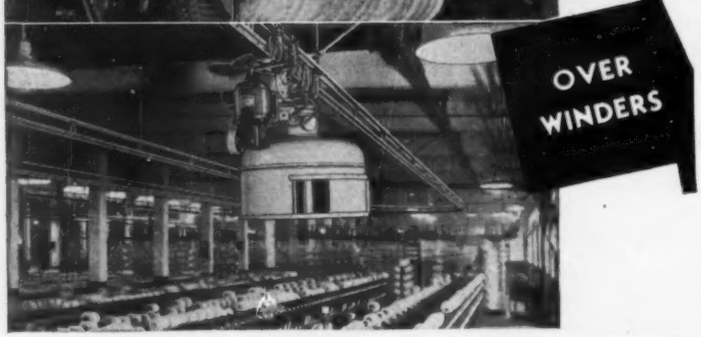


Overhead travelling cleaners not only keep frames clean but also send a blast of air toward ceiling, eliminating hand cleaning of overhead equipment.



A swirling column of air circulates freely through twister creels to eliminate breakage due to lint accumulation. Low headroom blower overcomes unusual ceiling conditions over high creels.

Card room ceilings are notoriously hard to clean. A high velocity column of air from a travelling fan directed against the ceiling prevents accumulation of fly on ceiling equipment.



High speed operation of winders can be greatly retarded by excessive lint. By preventing any accumulation on these machines maximum production is assured.

Let an American MonoRail Engineer explain the advantages of Automatic Cleaning. Send for illustrated catalog "Automatic Cleaning and Overhead Handling for Textile Mills."

THE AMERICAN MONORAIL COMPANY

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FAST, COMPLETE, UNIFORM FIBRE PENETRATION

THOROUGH DIRT REMOVAL

FAST, THOROUGH RINSING

Olate

A SOFT, PLEASING HAND

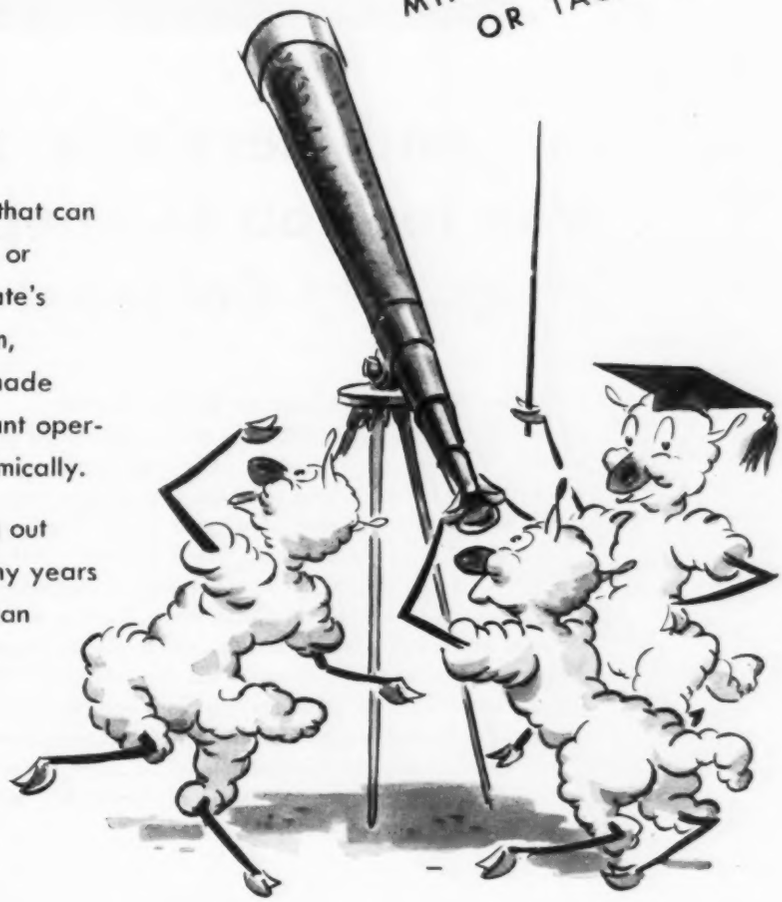
MINIMUM STICKINESS OR TACKINESS

"STARS" IN FULLING AND SCOURING!

You'll probably never find a soap that can top Olate's performance in woolen or worsted fulling and scouring. In Olate's purity, low titer, and thin flake form, there's a combination of qualities made to order for handling these important operations efficiently, safely and economically.

Try Olate. Its reputation for turning out saleable fabrics is based upon many years of successful use in countless American textile mills.

PROCTER & GAMBLE



Olate –

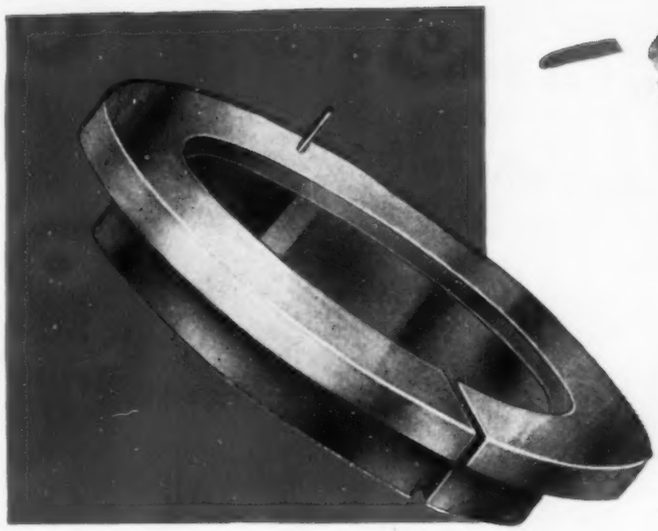
safe and efficient for every textile soap usage!

NOTHING TAKES THE PLACE OF COTTON

. . . and here's a new, easy way for you to shop and save on quality Cottons!

Here's a New Way to Save on Quality Cottons . . . Yes, thousands upon thousands of our customers are now saving money by ordering their Cottons from South Carolina Mills . . . the only mail order company in America selling Cottons exclusively! Our catalogs are packed with thrifty Cotton values for you, your family and home. Get your latest Free Cotton shopping guide today! Throughout its colorful pages, you'll discover Cotton's many wonderful qualities . . . its rich colors . . . smart styling . . . superior washability and durability . . . and its amazing versatility. Every item in our catalog is exactly as illustrated and described. If for any reason you are displeased with your Cottons, return them, and your money will be refunded. It's so easy to order, too. Your order will be carefully handled and the merchandise shipped to you promptly. *Postage is prepaid* if payment accompanies the order. Send for your Free copy of our latest catalog now . . . simply write your name and address on a penny postcard and mail it to: Dept. 39, SOUTH CAROLINA MILLS, Spartanburg, South Carolina.

SOUTH CAROLINA MILLS
SPARTANBURG, SOUTH CAROLINA



In the Groove

Accuracy and uniformity are essential in making ring holders, bobbin gears and bolsters. Skilled workmanship and quality materials mean that all Kluttz parts are machined inside and out to exact tolerances . . . that your rings and bobbins run smoother and last longer.

KLUTTZ CAST IRON RING HOLDERS are unsurpassed for smoothness, roundness, and durability. Available in sizes to fit any spinning frame.

KLUTTZ CAST IRON BOBBIN GEARS have the clean-cut, properly beveled teeth that make them run as true as higher-priced cut tooth gears.

KLUTTZ CAST IRON BOLSTERS are true inside and out.

For today's full measure of value, specify Kluttz.

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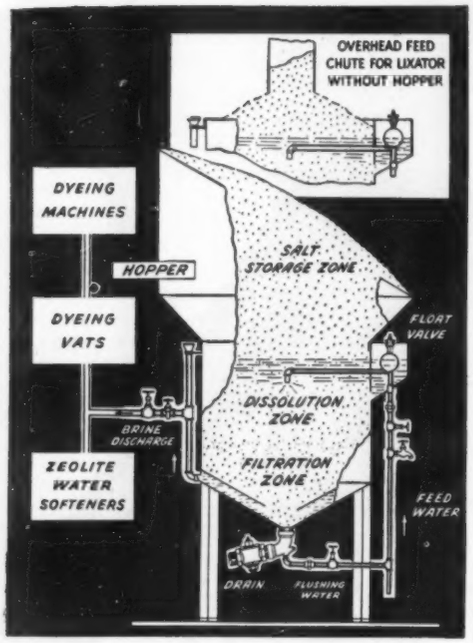
KLUTTZ MACHINE & FOUNDRY CO.
GASTONIA, N. C.

Q. How much Dry Salt in a Cubic Foot?

A. Anywhere from 66 to 84.5 pounds.

Q. How much Sterling Rock Salt in 1 gallon of Lixate Brine?

A. Always Exactly 2.65 pounds!



HOW THE LIXATOR WORKS

In the dissolution zone – Flowing through a bed of rock salt which is continuously replenished by gravity feed, water dissolves salt to form 100% saturated brine. **In the filtration zone** –Through use of the self-filtration principle **originated by International,** the saturated brine is thoroughly filtered through a bed of undissolved rock salt. The rock salt itself filters the brine. Nothing else is needed.

WHAT THE LIXATOR PROVIDES

- ✓ **Chemical and bacterial purity to meet the most exacting standards for brine**
- ✓ **Unvarying salt content of 2.65 pounds per gallon of brine**
- ✓ **Crystal-clear brine**
- ✓ **Continuous supply of brine**
- ✓ **Automatic salt and water feed to Lixator**
- ✓ **Inexpensive, rapid distribution of brine to points of use by pump and piping**

For Accurate Salt Measurement

"PASS the SALT" by LIXATOR

THE LIXATE PROCESS for making 100% saturated, self filtered, crystal clear brine *automatically*... is saving textile dyers thousands of dollars annually because it *measures salt accurately!*

For too much dry salt in dye baths, or unevenly distributed salt, causes spotting, streaking and white edges. Too little salt fails to exhaust dyes thoroughly, opens the way to uneven dyeing.

With the Lixate Process, accurate salt measurement is a certainty because each gallon of Lixate brine always contains exactly 2.65 pounds of Sterling Rock Salt. And it is a simple matter to add precisely the right amount volumetrically for efficient exhaustion of the dye.

Not only is guesswork eliminated, but so, too, are the labor and time of measuring salt by hand or mechanical devices, or by weight without regard to salt's varying moisture content.

Full details of how the Lixator saves money in your industry through accurate salt measurement, improved products and reductions in time and labor will gladly be given.

Get the full story on why accurate salt measurement is *always* possible with Lixate brine. Send for your copy of our *free* pamphlet *today!*

INTERNATIONAL SALT COMPANY, INC., Dept. TI-7, Scranton, Pa.

Gentlemen:
Please mail absolutely free your pamphlet, "How Lixate Brine Solves the Problem of Accurate Salt Measurement."

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The LIXATE *Process*
Reg. U. S. Pat. Off.
for making brine
INTERNATIONAL SALT COMPANY, INC.
Scranton, Pa.

settling decanting filtration ... are out

when you use Hooker Sodium Sulfide

In these days of soaring costs, few rayon manufacturers can indulge themselves in the luxury of time wasting, costly preparation of desulfurizing baths—especially when you can save all this with Hooker Sodium Sulfide. Hooker Sodium Sulfide is so free from impurities (an iron content as low as 8ppm. max.) that rayon plants are using the solution directly from the dissolving tanks. In some plants it is reported that they have added Hooker Sodium Sulfide directly from the drum into the desulfurizing bath. In either case the time consuming and costly process of settling and decanting or filtration are eliminated. There is no loss of chemicals in the disposal of sludge and no special equipment is required for disposal of high sulfide sludge wastes.

Fixed controlled Alkalinity saves Caustic Soda . . .

Another saving for you when you use Hooker Sodium Sulfide is in the caustic soda used for maintaining alkalinity of desulfurizing bath. Hooker Sodium Sulfide has a fixed controlled alkalinity. This means a substantial economy in the amount of caustic soda required to adjust alkalinity within the limits required.

If you have not yet tried Hooker Sodium Sulfide for your desulfurizing baths, we suggest you send for a trial shipment. It is sold in 90 and 350 pound steel drums.

SPECIFICATIONS:

HOOKER SODIUM SULFIDE, Na_2S

a light yellow colored solid in flake form, soluble in water, slightly soluble in alcohol, insoluble in ether.

ANALYSIS

Sodium Sulfide	60 to 62%
Sodium Chloride	1.5% Max.
Other Sodium Salts	2.0% Max.
Iron	8ppm. Max.
All other metals	1ppm. Max.
Water of Crystallization	36.5 to 34.5%

HOOKER ELECTROCHEMICAL COMPANY

14 Forty-Seventh St., Niagara Falls, N. Y.
New York, N. Y. Wilmington, Calif. Tacoma, Wash.

HOOKER CHEMICALS

7-353

Caustic Soda **Muriatic Acid** **Chlorine**

Paradichlorbenzene **Sodium Sulfide** **Sodium Sulfhydrate**

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Recognized by Reputation

For over a quarter of a century, Stewart has supplied the textile industry with the highest quality replacement parts.

Today, as always, mills rely on Stewart's reputation to give them parts that FIT.

STEWART MACHINE COMPANY, INC.

GASTONIA • N. C.

better QUALITY through research

The Control Laboratory at A. E. Staley Manufacturing Company. During every 8 hours of operation 6 samples, from various stages of processing, are tested to guarantee highest quality of all Staley Textile Starches.

•

Highly trained laboratory technicians are on the job day and night — keeping vigilant watch over production uniformity — to guarantee the uniform high quality and dependable performance of every shipment...permitting sizing formulas to remain constant.

Staley's complete line of Textile Starches makes it possible to select the correct starch for any sizing formula. Over a quarter-century of practical experience in serving the industry — the most modern and up-to-date laboratory facilities and highly trained personnel — are behind the superior quality of Staley Starches. Tell us your requirements and we can recommend the exact Staley Starch for your sizing needs. Write, wire or phone for complete information.

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MANUFACTURERS

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When our customers think of STEIN-HALL some see laboratory smocks,
microscopes and rubber gloves...and some see pin-stripe suits,
brief cases and order pads.

The astigmatism needn't be corrected though,
for STEIN-HALL actually is all of them
...and at the same time.

In our 82-year-old TEXTILE SALES DEPARTMENT...
the laboratory equipment is responsible for studying,
testing and improving our products...
the salesman garb for telling *you* about them.

For 82 years now, we've been in perfect focus...
which is why the name STEIN-HALL
is among the most honored in the world.

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OUR warm congratulations to Textile Industries for this 50th anniversary issue. You have been of great service to the textile industry and your success is well deserved.

We ask that you take our order, now, for your 100th anniversary issue. We feel confident that with your progressive and sound editorial policies you will still be publishing Textile Industries 50 years from now.

We, also, are planning to be in business 50 years from now. One of the many efforts we are making to insure our continued operation for many years to come, is our program of long range research. This research is continually seeking new ways in which textiles can better serve American industry and contribute to the progress of our country.

In our textile laboratories are the beginnings of new techniques, new processes, that may well be standard practice in the industry 50 years from now.

We look forward, with you, to your 100th anniversary issue.

West Point Manufacturing Company

West Point, Georgia

Industrial, Household, Agricultural and Apparel Textiles

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LANETT MILL	SHAWMUT MILL	LANGDALE MILL	WEST POINT UTILIZATION COMPANY	FAIRFAX MILL	RIVERDALE MILL
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THE DIXIE COTTON MILLS — WELLINGTON SEARS COMPANY, *SELLING AGENTS* — COLUMBUS MANUFACTURING COMPANY

Speed Changes are Quick, Exact with *Vari-Pitch* Sheaves!

Speed to Fit the Job! These roller mills, equipped with *Texrope Vari-Pitch* sheaves for motion control can be set instantly to exact speed for best production under all operating conditions. Can you profit by accurate speed control? *Texrope Vari-Pitch* drives are simply and economically applied to machine tools, pumps, blowers, conveyors or other machines.

Save Money With "Pre-Engineered" Texrope Drives

You can solve 90% of all V-belt drive problems, from 1 to 150 hp, with economical stock *Texrope* V-belts and sheaves. The *one best* drive is selected quickly and simply from a new 144-page manual listing 22,000 "Pre-Engineered" drives. Bulletin 20B6956. ALLIS-CHALMERS, MILWAUKEE. *Texrope, Super-7, Texsteel, Texdrive, Magic-Grip* and *Vari-Pitch* are Allis-Chalmers trademarks.

A Complete Range of Products		
Super-7 V-belts	5 types . . . sizes to suit every power transmission job	
Texsteel, Texdrive, Magic-Grip	Sheaves in a full range of sizes and grooves	
Vari-Pitch Sheaves	Exact variations in speed — Stationary or Motion control	
Speed Changers	Speed variations up to 375% at the turn of a crank	

A 2428

Texrope Super-7 V-belts result from the cooperative research of Allis-Chalmers and B. F. Goodrich; and are sold only by A-C dealers and offices.

ALLIS-CHALMERS

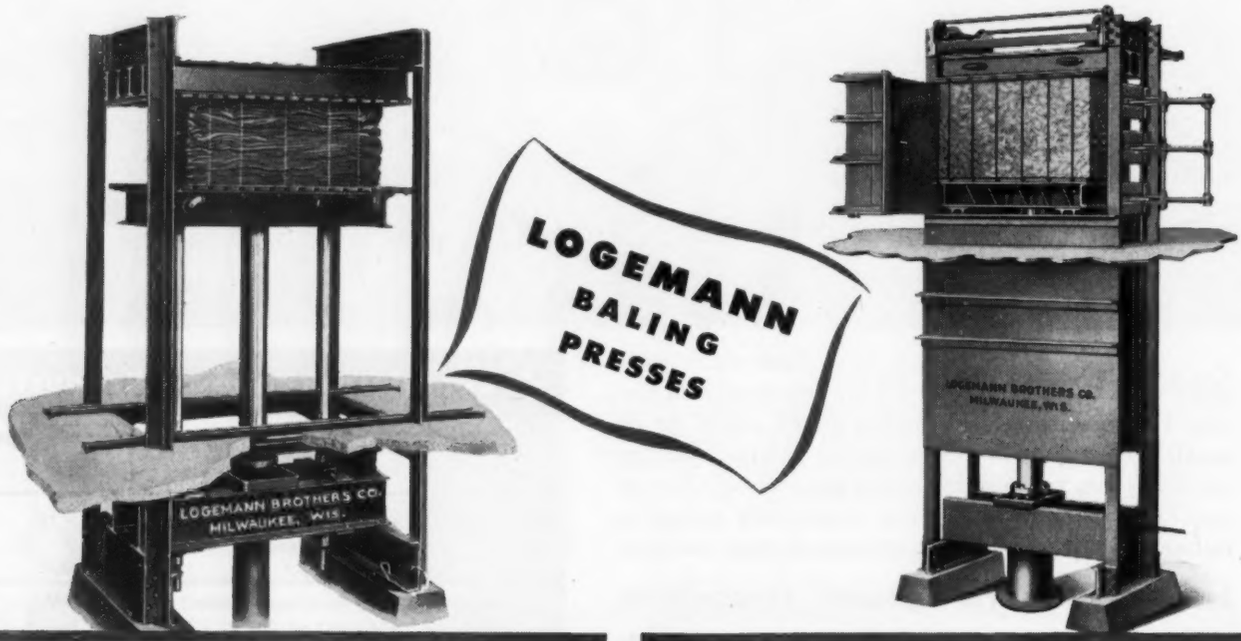
Originators of the Multiple V-belt Drive for Industry

MAKE YOUR BALING A *Profitable* OPERATION *with a* LOGEMANN BALER

Tell Us Your Baling Problems

The best way to get the right answers to low-cost, time-saving baling is to present your problems to Logemann. Our engineers know how to make baling operations pay their own way in faster, more reliable handling of bales. Many Logemann Balers have been in profitable operation since the turn of the century . . . proof of the ruggedness, durability and long service life of Logemann Baling Presses.

Now is the time to find out how efficiently Logemann Balers can help you. Tell us what your specific problem is and our engineers will show you how Logemann can give you better bales at lower costs. Let us give you our recommendations. Write for further information today!



Open balers for finished goods may be hydraulic or power-driven. Give platen dimensions required, maximum height of pile to be compressed, number of bales per hour, when requesting information on open balers.

Box balers for waste may be obtained in either the hydraulic or power-driven type. Mention the kind of waste to be baled, how much in how many hours, the preferred size or weight of bale when inquiring about box balers.

LOGEMANN BROTHERS CO.

3102 West Burleigh Street • • • Milwaukee 10, Wisconsin

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IDEAL PROCESSING WEATHER

The

AMCO EVAPORATIVE COOLING AT PONEMAH IMPROVES YARN STRENGTH — AIDS SPINNING

Part and parcel of Ponemah's reputation for fine count cottons and rayons are the continuous efforts made to assure fabric superiority. An important recent step was the introduction of AMCO Evaporative Cooling.

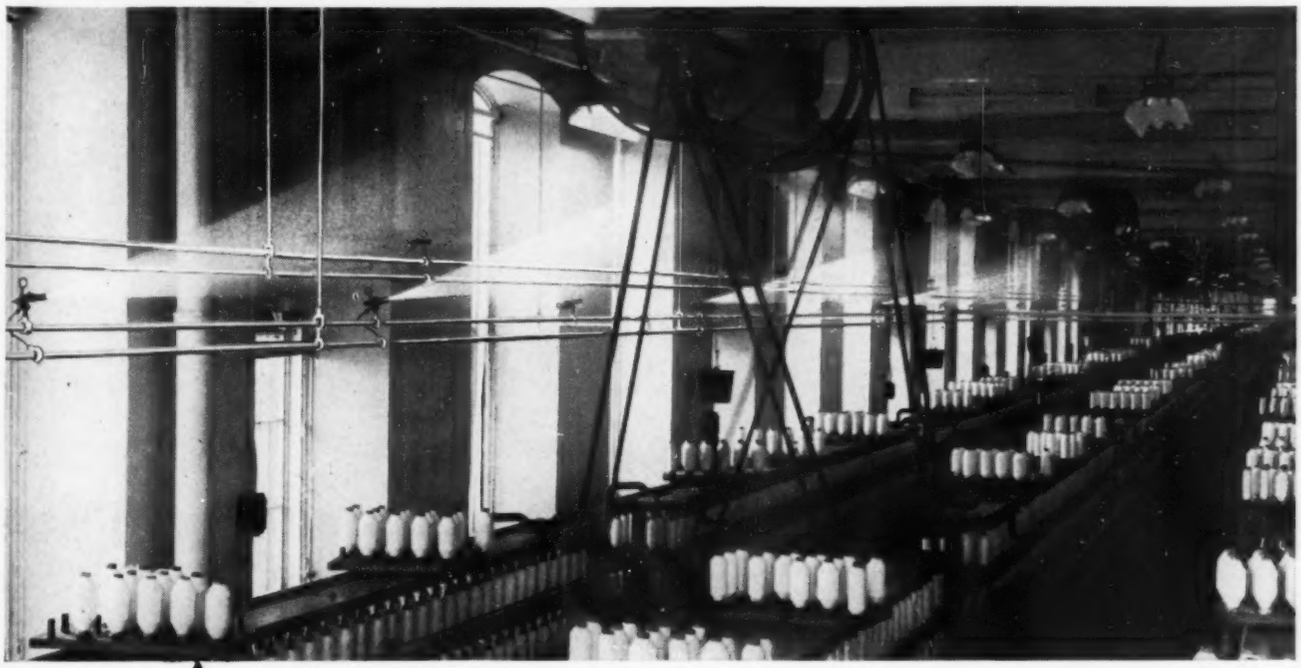
Ponemah already had humidification. The addition of AMCO Evaporative Cooling has proved a low-cost, practical way of meeting the excessive heat burden imposed by the spinning process. The results have been greater yarn strength, more efficient spinning, improved worker comfort.

AMCO Evaporative Cooling utilizes the humidification system to absorb the frictional heat of high speed machines in conjunction with carefully controlled airflow. No ducts or expensive alterations are needed. Installation can normally be made without serious interference with production.

Right now — see for yourself how quickly this system pays for itself with greater production, lower costs. An AMCO engineer will be glad to make a survey and submit recommendations for the exact system to meet the particular conditions and needs of your mill.

FEATURES OF AMCO HUMIDIFICATION AND COOLING

- ★ Reduces excessive temperature and holds relative humidity at point best suited to fibre and process.
- ★ Speeds production in high friction (heat) areas.
- ★ Assures evener yarn counts and increases breaking strength.
- ★ Gradually increases regain for good roving and consequent better spinning.
- ★ Drafting of fibres smoother and more compact.
- ★ Waste and fly greatly reduced.
- ★ No cumbersome ducts to require cleaning and obstruct light.
- ★ Easier to install — minimum disruption.
- ★ High flexibility to meet changing room conditions.
- ★ Minimum maintenance.
- ★ Amco Evaporative Cooling utilizes your present humidification system.
- ★ Increases worker comfort.



AMCO **HUMIDIFICATION and COOLING**

AMERICAN MOISTENING CO. AFFILIATED WITH GRINNELL COMPANY, INC. PROVIDENCE, R. I. · BOSTON · ATLANTA · CHARLOTTE

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Controlled Factory-Engineered homes on mass-production is the answer to your Industrial Housing Demands. KNOX has the resources, supplies, labor, engineering talent—in a word—the "know how".

The key to a front door of a new KNOX HOME is protected all along the line. Our motto, "From Tree to Key", is exactly that.

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A beckoning one . . . an invitation to all of us who constitute the cotton textile industry to make the next fifty years of its history even greater than the last . . . a challenge to bring all our resources and experience to bear upon making even better fabrics for the millions of America and the world.

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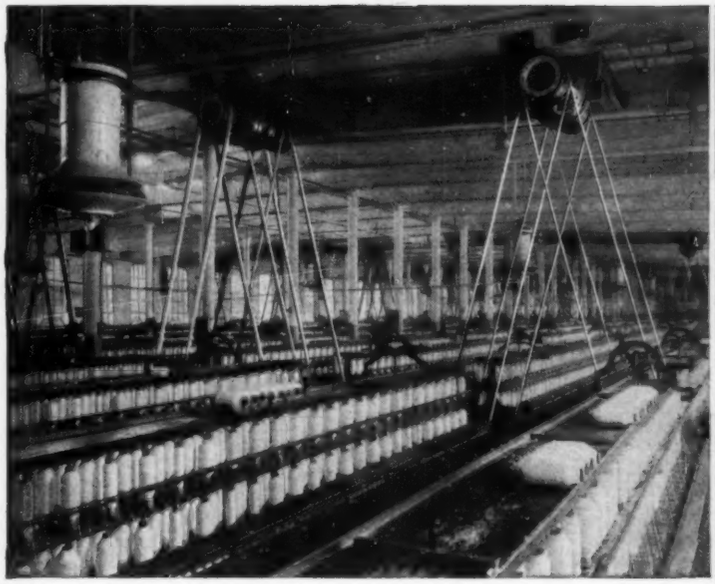
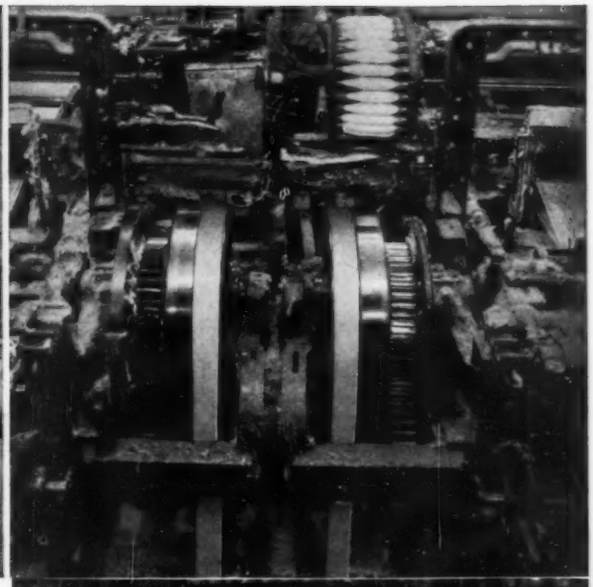
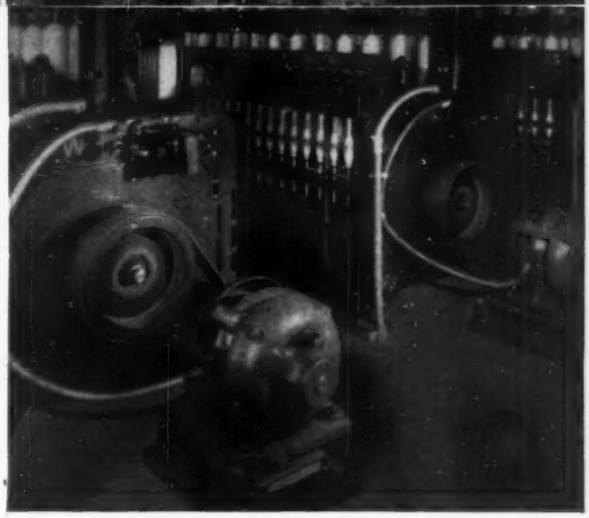
Manufacturers of **Canton DENIM**

RHOADS *Tannate* LEATHER BELTS *increase production ... lower costs*







In carding, spinning or weaving, Rhoads Tannate Leather Belts pay for themselves through more production, greater operating efficiency, lower operating costs and minimum maintenance, assuring fewer machine shutdowns, greater uniform yardage, less spoilage.

Tannate Belts withstand high temperature, humidity, machine oil and many chemicals; carry full load even when damp; require fewer take-ups and less maintenance; have a high power transmitting capacity; are stronger than most oak belts.

For greater production at lower costs, investigate Rhoads Tannate Leather Belts.

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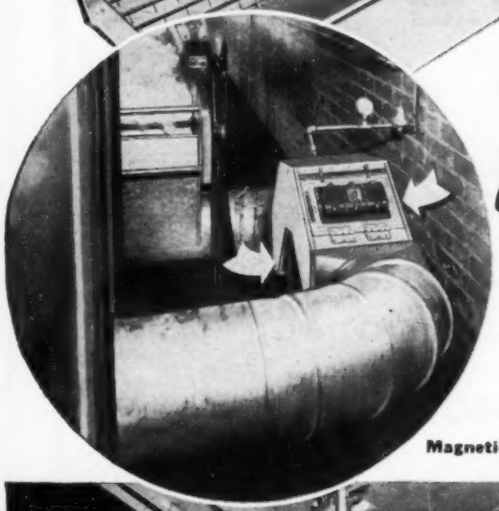
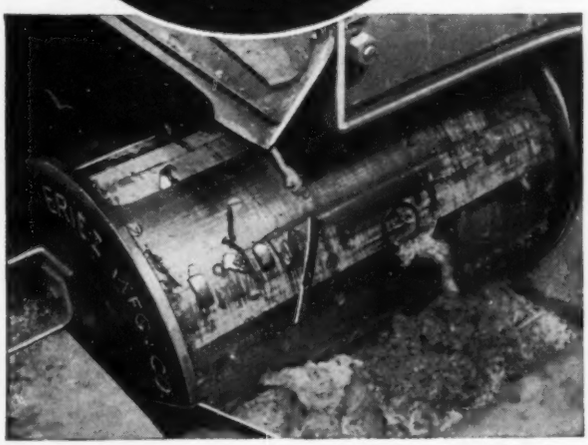
Spiked Apron Magnet



Magnetic Hump



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with Eriez NON-ELECTRIC *Permanent* MAGNETS

THESE three installations are typical in showing how hundreds of Eriez users in the textile industry have eliminated tramp iron from their processing lines . . . how they have thus bought positive insurance against fires and damage to processing machinery. Your choice of Eriez Non-Electric Permanent Magnetic Protection is profitable too! First cost is last cost . . . no rectifiers, transformers, or other electrical gadgets needed. Operating and maintenance costs are cut to zero! Whatever your separation needs, there's an Eriez to fit the job. Eriez Non-Electric Permanent Magnetic Protection is engineered to fit your requirements efficiently and economically . . . Let us send our nearest Eriez Engineer to consult with you.

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Please send bulletin No. 104 A and the following:

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Won't SHAKE LOOSE!

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KNURLED
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Square Head Set Screws

The "Unbrako" SELF-LOCKING Square Head Set Screws, as shown, are "real Fasteners" . . . they positively *will not* shake loose! A loose "Fastener" *invariably causes* shut-downs, *invariably causes* loss of production, and *invariably causes* increased costs—each of which these "Unbrako" Screws absolutely prevent. Why? — because of the popular "Unbrako" *Knurling* feature — which is incorporated on the internal cup point (A), and on the external cup point (B) . . . making *these* Set Screws "Unbrako" SELF-LOCKERS.

If and when the head of an "old style" square head set screw twists off, just to get it out costs many times the price of the screw these days . . . especially if it's in an awkward place! But the "Unbrako" Square Head Set Screw, made of a special alloy steel, is a "brute" for strength — it's practically *impossible* to twist its head off, — thus, helping to reduce the cost of maintenance materially. Ask for *your* copy of the "Unbrako" Catalog of Screw Products.

Write us for the name and address of your nearest "Unbrako" Industrial Distributor.

Knurling of Socket Screws originated with "Unbrako" in 1934.

"UNBRAKO" SOCKET HEAD STRIPPER BOLT WITH KNURLED THREADS AND HEAD

Pat'd and Pat's Pending

*

The Knurled Threads of this "Unbrako" Socket Head Stripper Bolt make it a "real Fastener" . . . a Self-Locker that positively **will not** shake loose! Knurling of the head allows for fumble-proof grip—even if fingers and head are oily — thus, materially **speeding** production.

"UNBRAKO" SOCKET SET SCREW WITH KNURLED CUP POINT

*

"WON'T SHAKE LOOSE"

The Knurled Cup Point of the "Unbrako" Socket Set Screw makes it a Self-Locker—positively **will not** shake loose—even when subjected to extreme vibration! "Unbrako" Socket Screw Products are available in Stainless Steel and other metals or metal alloys.

"UNBRAKO" SOCKET SET SCREW WITH KNURLED THREADS

*

The Knurled threads of this UNBRAKO "Won't Shake Loose" Socket Set Screw make it a Self-Locker, too, for use where the point does not lend itself to knurling.

"FLEXLOC" SELF-LOCKING NUTS

*

"WON'T SHAKE LOOSE"

The All-Metal, One-Piece "Flexloc" is a Self-Locking Nut that won't budge, regardless of vibration, except when a wrench is used. It can be used over and over without losing much of its torque and being a "stop" nut it will stay locked in any position on a threaded member—"a real fastener," if ever there was one. Let a few free samples convince you.

OVER 45 YEARS IN BUSINESS

*Pat'd and Pats. Pend.

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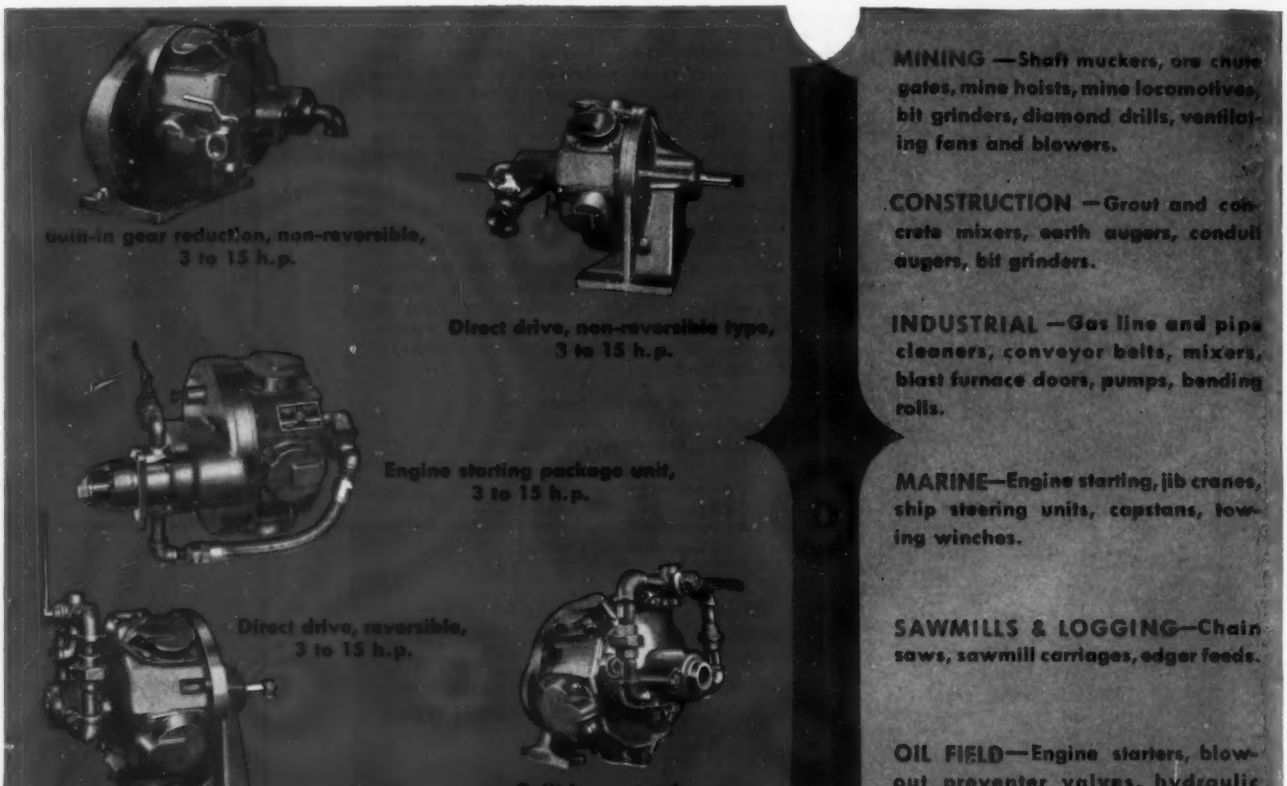
BRANCHES: BOSTON CHICAGO DETROIT INDIANAPOLIS ST. LOUIS SAN FRANCISCO

NO other kind of power excels *air* power in safety, flexibility, freedom from damage due to overloading, and simplicity of control. That's why Gardner-Denver air motors find such a wide application. These 5-cylinder radial air motors are remarkably compact. They can be controlled to operate at any desired speed up to their maximum r. p. m. They have unusually high torque for high starting loads. They are simple, durable and light in weight.

for greater flexibility, safety, convenience . . .

GARDNER-DENVER AIR MOTORS


Built-in gear reduction, non-reversible, 3 to 15 h.p.
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Direct drive, reversible, 3 to 15 h.p.
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MINING —Shaft muckers, ore chute gates, mine hoists, mine locomotives, bit grinders, diamond drills, ventilating fans and blowers.
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SAWMILLS & LOGGING—Chain saws, sawmill carriages, edger feeds.
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For complete information, write Gardner-Denver Company, Quincy, Illinois

GARDNER-DENVER SINCE 1859

Atlanta, Ga. Birmingham, Ala. Boston, Mass.
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New York, N. Y. Philadelphia, Pa. Pittsburgh, Pa.
New Orleans, La.

The two large bronze travelers illustrated actual size each weigh 600 grains and are used for twisting sash cord and heavy twine. No. 12 and No. 16 bronze twister travelers are shown for comparison. These "heavy weights" are the biggest in Victor's line of some 15,000 sizes and styles for every spinning and twisting need.

ARE TRAVELERS THE *Biggest* THINGS *in your yarn production setup?*

ACTUALLY, they are about the smallest piece of equipment you use in fiber processing. But they *can* be one of the biggest, in point of time and production lost, if you choose the wrong traveler. A little traveler can become your biggest headache.

With the new interest in worsted yarns prepared on the cotton system, and with so many new synthetics and blends coming up for processing, it is more difficult today than ever to be sure the traveler you use is right for the job. Experience with conventional fibers helps. But, to save precious time in setting up smooth-running spinning and twisting, you need up-to-the-minute information.

You can get that kind of information from a man whose job it is to keep abreast of every new development. The Victor Service Engineer is fully prepared to help you keep out of traveler trouble, and, more than that, help you raise production and quality, often well above what you expected.

Make sure you are getting the most and the best from your frames, whether you are running blends, straight synthetics, or conventional fibers. Write, wire or phone, and a Victor Service Engineer will call promptly.

★

Keep a Step ahead with

VICTOR Ring Travelers

VICTOR RING TRAVELER COMPANY

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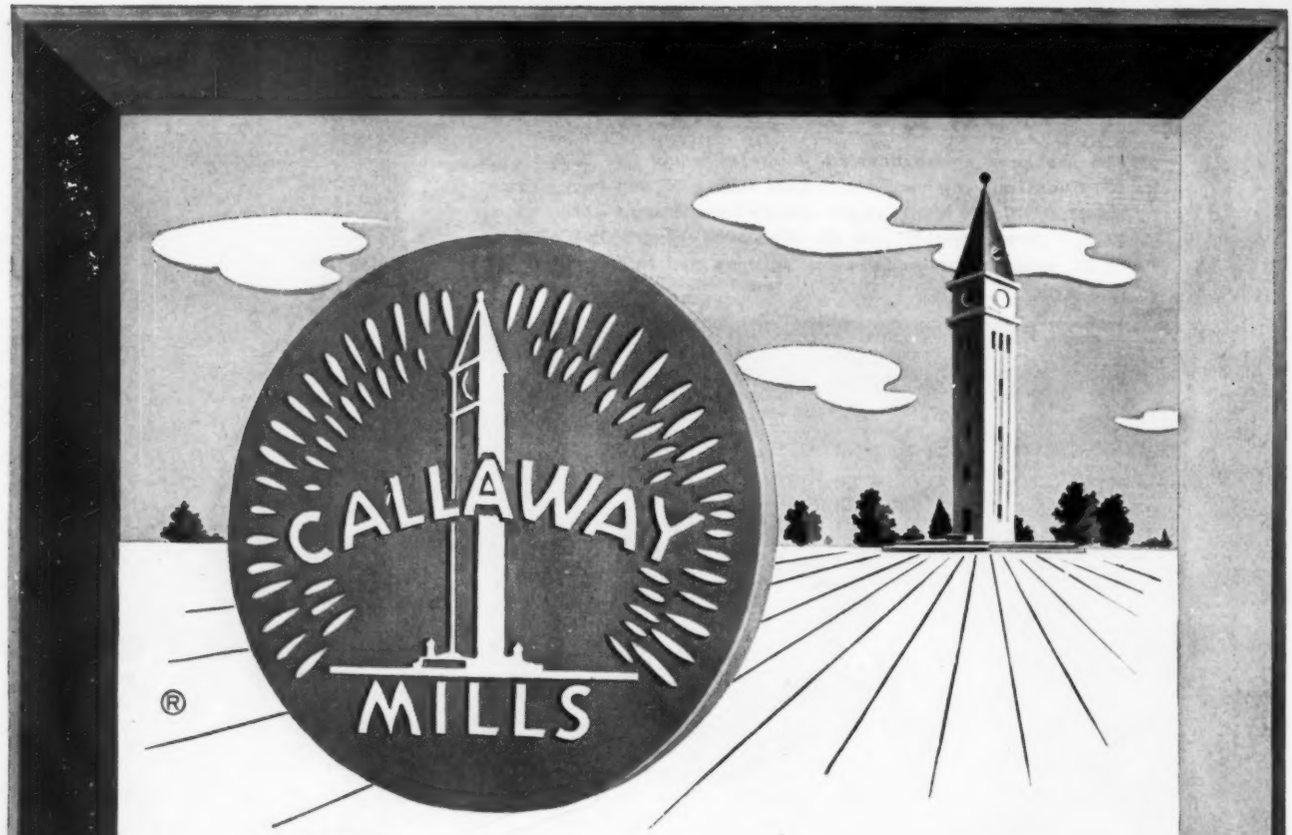

THE FULLER E. CALLAWAY MEMORIAL TOWER, erected by the employees of Callaway Mills to commemorate the ideals of the founder of this business, was the inspiration for our trademark. This trademark now symbolizes the spirit of our entire organization. Every product made by Callaway Mills Co., and the service which goes with it, must measure up to high standards of quality if it is to carry the Callaway trademark.

FABRICS AND YARNS FOR INDUSTRIAL AND HOUSEHOLD USE

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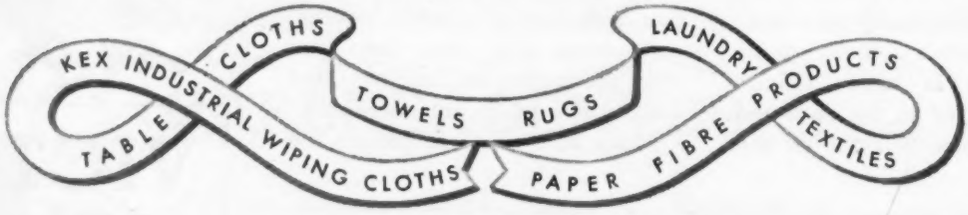

45 YEARS OF EXPERIENCE IS BACK OF...

BARBER-COLMAN WARP-TYING MACHINES

The shop pictures above and below show a few of the skilled mechanics whose experience and aptitudes contribute vitally to the quality and performance of Barber-Colman machines.

REPAIR PARTS AND SERVICE MEN AVAILABLE PROMPTLY

No machine made can function without Service. That is why, since the inception of Portable Warp Tying Machines forty years ago, Barber-Colman has backed these machines with two important Service Departments. One is Repair Parts and the other is Service Men. Repair Parts makes, puts in stock, and delivers the pieces and assemblies that wear out from time to time, and need to be replaced quickly to keep the machines operating. Service Men are skilled and experienced individuals, available on short notice from strategically located centers, who are trained to diagnose quickly the ills of any machine, make necessary adjustments or replacements, and revitalize its productive functions. The forty years of experience which backs the performance and visualizes the developments of Barber-Colman Portable Warp Tying Machines could easily be nullified by inadequate Service. That is why, when you use Barber-Colman equipment, you can be sure you have *good* machines that can be kept operating easily at top efficiency.

AUTOMATIC SPOOLERS • SUPER-SPEED WARPERS • WARP TYING MACHINES • DRAWING-IN MACHINES

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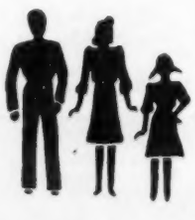
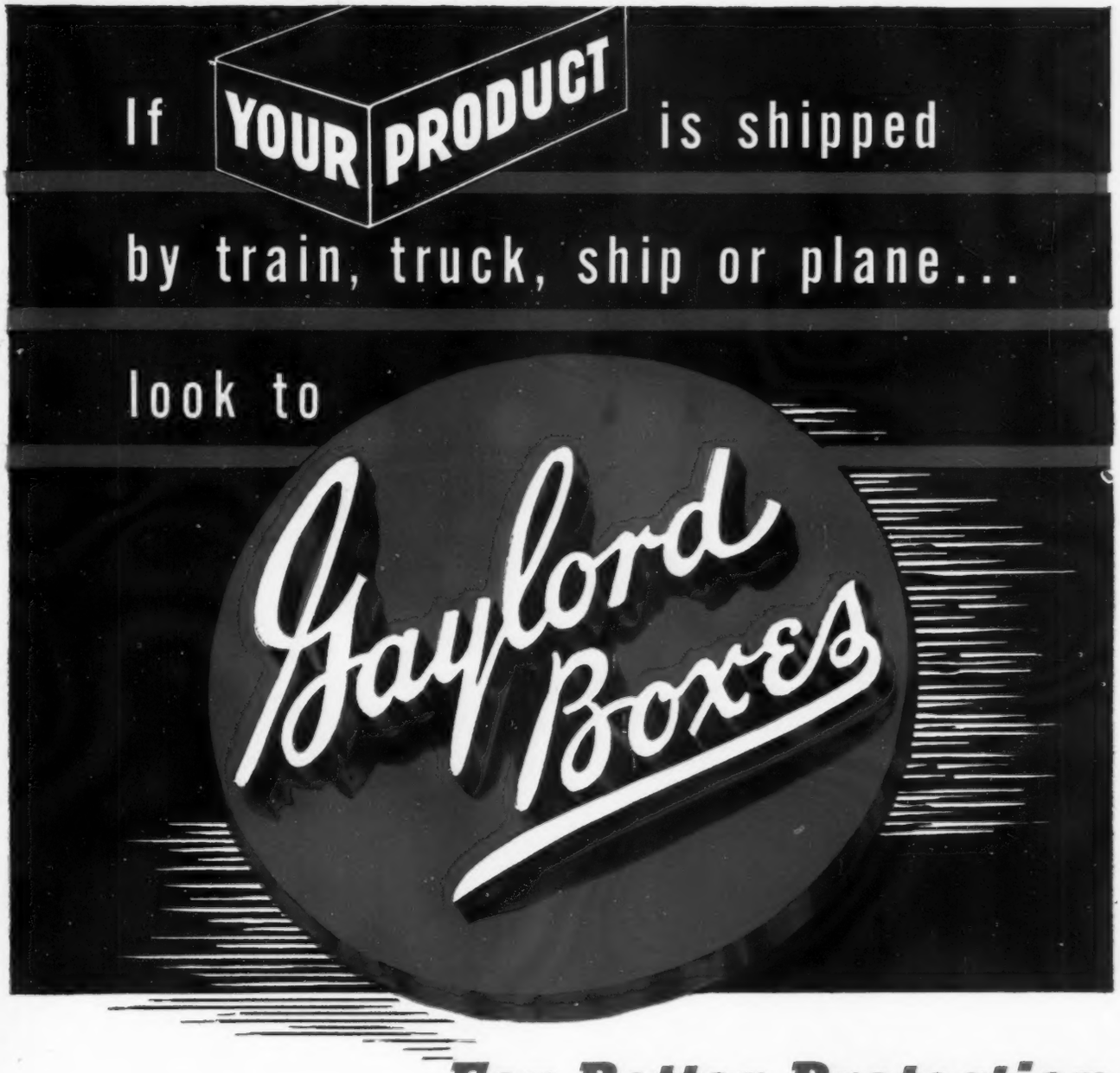


Plants at Trion, Georgia and Ware Shoals, S. C.



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- Corrugated and Solid Fibre Boxes
- Folding Cartons
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In these days of ever-increasing display merchandising, it's more important than ever that your products reach the dealer and consumer as attractive as when they leave your plant.

Your nearest Gaylord Sales Office will show you how Gaylord Boxes can reduce damage claims and help to protect your good will. Call them.

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CLOTH IS MADE FROM MORE THAN YARN

Each figure represents the location of a plant.

INTO the warp and woof of good fabrics go many things... but more than anything else, *it's men and women who make the cloth.* No other factor is more important than the more than twelve thousand skilled operators who produce Cone fabrics. *Their* interest ... *their* pride... *their* loyalty... indelibly stamped on the Carolinas, is responsible for the fine textiles which bear the Cone "Seal of Service".

This seal, recognized as a mark of distinction in fabrics, is also a symbol of opportunity and security for *each* individual employee and the community in which *he* lives. From *their* many hands quality fabrics go out to the world... the product of *free men and women* who daily live and practice democracy.

CONE MILLS CORPORATION
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SANDOZ PRESENTS

the color achievement of the month

Colors to Suit

...BY LIPPITT

The Lippitt Worsted Mills sends its fabrics to market with confidence in their color-rightness. The aqua suit shown here—cut from Lippitt's all-worsted "Twillardine"—was a sensational number in spring sales because it suited the high-style tastes in both design and color.

But the customer's choice is not all that Lippitt aims for in its *own* selection of colors. Other reasons why Lippitt uses Sandoz colors include their convenience and dependability in the dyeing operation and the certainty they afford of successfully resisting the effects of wear, sunlight and cleaning.

Mills like Lippitt appreciate the Sandoz policy of "thinking ahead with textiles", and among the Sandoz developments being followed with great interest is the contribution of Sandoz Metomega Chrome Colors to the time-saving Metachrome method. Among the colors in the Metomega line are the following, which offer a great variety of shades:

Metomega Chrome Grey GL . . . Grey 2 GL . . . Green BLL . . . Brown RLL . . . Brown 3 GL . . . Orange ML . . . Yellow ME . . . Red GM

For acid, chrome or direct dyes . . . or auxiliary chemicals . . . for both natural and synthetic fibres . . . be guided by the successful "color achievements" you see in these Sandoz advertisements.

SANDOZ CHEMICAL WORKS, INC., 61 VAN DAM STREET, NEW YORK 13, N. Y.

Application laboratories and stocks at Boston, Philadelphia, Charlotte, Los Angeles, Toronto. • Other branches at Providence, Paterson, Chicago.

SANDOZ *thinks ahead with textiles*

SANDOZ

THIS IS NO. 70 OF A SERIES ON

GETTING THE MOST FROM WINDING

Information about winding designed to show improvements in winding equipment and new ideas in the winding operation

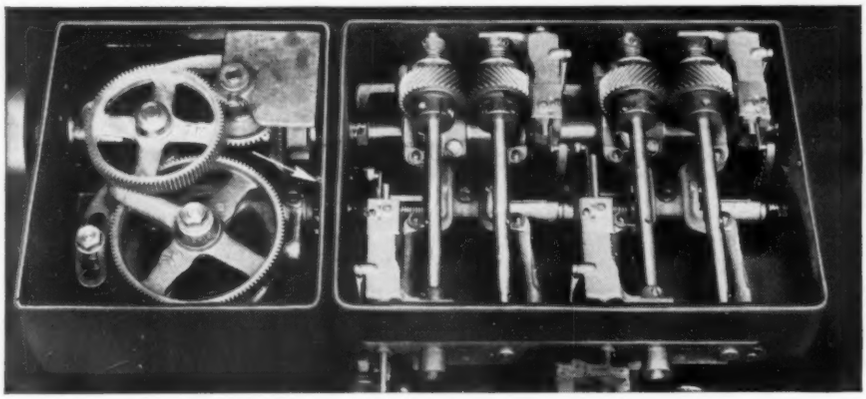


Fig. 1—Gainer case and frame showing connecting oil tube.

HOW HOT CAN OIL BE?

No. 90 Winding Machine

With the arrival of hot weather, many mills will become concerned over the heat of the machinery they are operating.

Ordinarily, excessive heat in a motor, bearing or machine is a good index of overloaded condition. But it should be remembered that the true indication of overloading is not the temperature of the equipment but *how far above the surrounding temperature* it is.

For instance, in a room where the temperature is 90 F, the average motor could not be considered overloaded unless its heat were above 160 F.

A case was reported to us where the temperature of the oil in a No. 90 machine was 150 F at a time when the surrounding temperature was in the neighborhood of 95 F. From checking with the oil company engineers we found that this was not excessively hot when compared to the heat in the room.

However, even though the oil may not be hot enough to impair its lubricating qualities or endanger the mechanism, it is possible to load the machine unnecessarily by the wrong kind of oil or too much of it.

We recommend a high-grade machine oil having a Saybolt viscosity of 120 to 140 seconds at 100 F. A lighter oil does not properly lubricate the machine; one that is much heavier, besides overloading the motor, causes the machine to start sluggishly in the morning. It also causes clutches to slip, and corkscrew bobbins result.

There should be oil in the bottom of each frame and the gainer case up to the level of the interconnecting oil tubes (see Fig. 1), but not above those points. This allows an ample reserve of oil to be picked up by the spindle driving gears and splashed throughout the interior. But if the level is too high, there is leakage out of frame covers, clutch levers, drive shaft, and even spindles.

Adherence to the lubricating instructions is necessary for the best performance of the machine.

HEAVY YARN TENSION Roto-Coner*

The standard disc tensions on the Roto-Coner* can handle satisfactorily everything from the finest to nearly the coarsest yarns. But when considerable density is required on the coarsest yarns, more tension is required.

The Heavy Yarn Tension uses two large porcelain discs held together by an adjustable spring arrangement. The adjustment is made by means of two knurled thumb screws above the spring. The lower one is the adjuster; the upper one a check to maintain the setting. Tension is regulated by the amount of pressure on the spring.

When the Heavy Yarn Tension is used, two pressure weights should also be used, so that pressure on the package will be in line with yarn tension. One weight is below the spindle holder and one above it. The upper weight when used in conjunction with the lower one has a counterbored hole that fits over the screw that holds the lower weight. If the lower weight is added, the pin should be removed from the upper weight, and a 3/8 in. hole drilled for a short distance to fit over the screw.

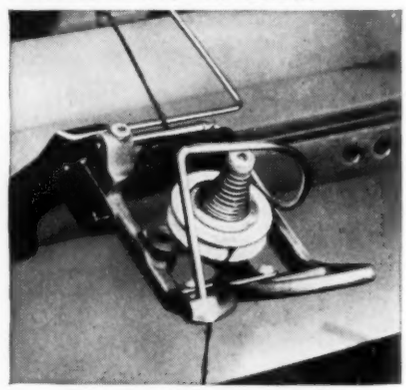


Fig. 2—Heavy yarn tension.

*Reg. U.S. Pat. Off.

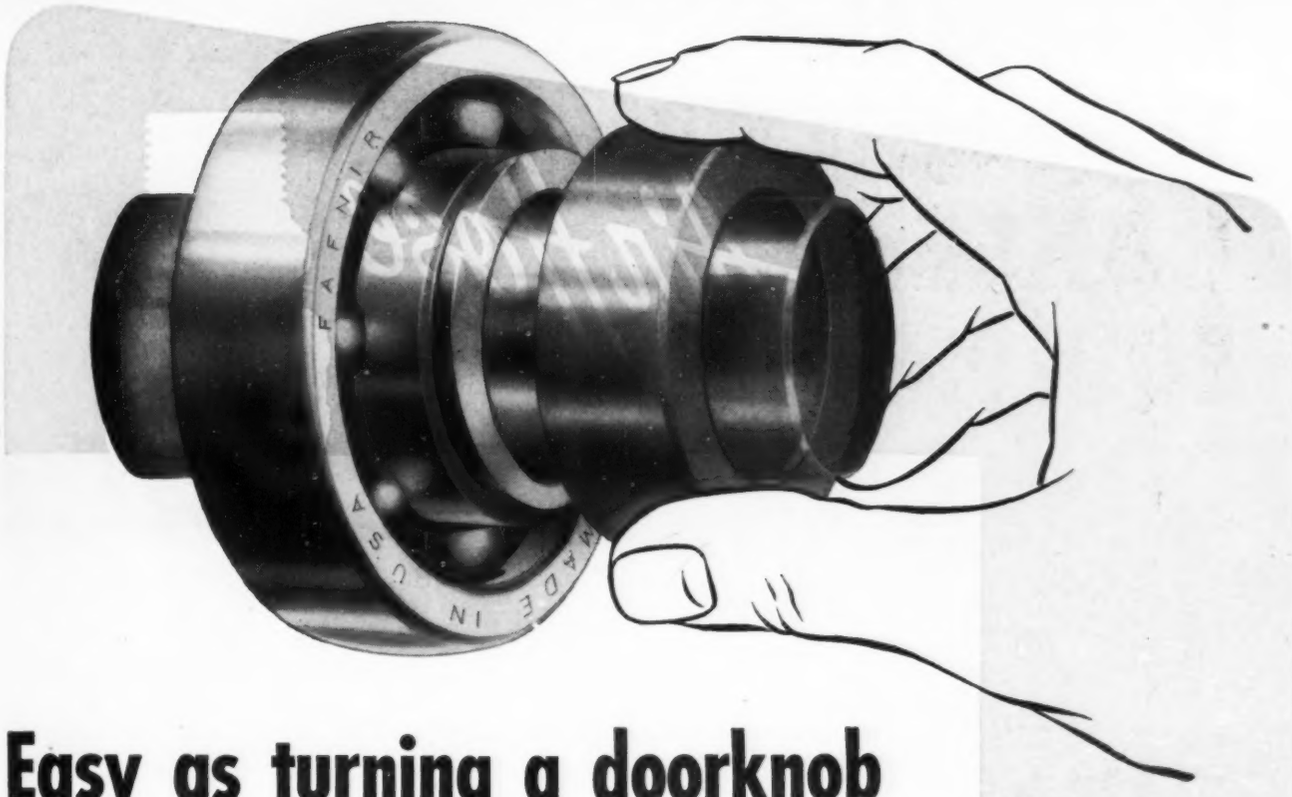
July, 1948

23-8-1

"THERE'S A UNIVERSAL WINDER FOR EVERY TEXTILE NEED"

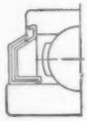
UNIVERSAL WINDING COMPANY

PROVIDENCE BOSTON PHILADELPHIA UTICA CHARLOTTE ATLANTA CHICAGO LOS ANGELES MONTREAL and HAMILTON



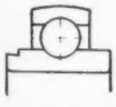
Easy as turning a doorknob

HERE'S HOW SIMPLE, fast and easy it is to mount a Fafnir Wide Inner Ring Ball Bearing on any shaft, anywhere, for any purpose. Pick the inch dimension bore size for your standard shaft. It slip-fits on the shaft and locks with a twist of the wrist. Turn the set screw for double-locking and the job's done. No shoulder to machine! No threading! No lock nuts, sleeves or adapters! Removes as easily. And that's not all . . .



Foul-proof seals

No displacement of the seals to worry about no matter how much shaft misalignment you have. The seals are integral with the bearing . . . move with the bearing and shaft. It's the Mechani-Seal, a labyrinth of interlocking steel plates which traps in lubricant and traps out dirt, dust and moisture.

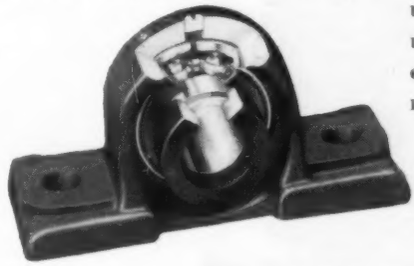


Easy to make self-aligning

See that rounded contour on the outer ring? A simple machining job on any type housing gives a matching contour in which the bearing moves freely yet is always square with the load.

Simple, inexpensive housing

The cut-away Fafnir Pillow Block shows how simple the housing can be for this Wide Inner Ring Bearing. Simple grooves on the inside surface of the housing conduct lubricant from the port at the top, around the exterior of the bearing and into the bearing through two holes in the outer ring. Since this bearing is completely self-sealed, no baffles, shields or other extra housing pieces are needed. Fafnir makes a complete line of housings for transmission units . . . pillow blocks, hanger boxes, cartridges, fan boxes and take-up units . . . and units for practically all textile machines.



Save money, machining, labor!

For replacing plain bearings, for new machinery set-ups, for most any friction eliminating job in your plant, Fafnir Wide Inner Ring Ball Bearings and special housings short-cut the job, save time and money and give you a bearing easier to install, remove and maintain. Your nearby Fafnir distributor will help you pick out just what you need. The Fafnir Bearing Company, New Britain, Conn.

MOST COMPLETE LINE IN AMERICA

FAFNIR
BALL BEARINGS

Remove Lint Thoroughly With HANSEN EQUIPMENT *Air Hose*

Courtesy [illegible] Cotton Mills

HANSEN REPRESENTATIVES

New England States . . . . A. D. Geiger, Belmont, Massachusetts
Southern Ohio, W. Va., Ky.: Steinhagen Airline Products, Dayton, Ohio
Eastern, Southern States . . . . . B-R Engineering Co., Baltimore, Md.
Colorado, New Mexico, Utah, Wyoming: E. C. Wild Co., Denver, Colorado
Southwest Territory . . C. C. Brownfield, Dallas, Texas
Arizona, So. California . . . . . Barkiyn Company, Los Angeles, California
Idaho, Oregon, Washington . . . Jack J. Kolberg, Seattle, Washington
Central Western States . . . John Henry Foster Company, St. Louis, Missouri, Minneapolis, Minnesota
Northern Cal., Nevada . . H. E. Linney Company, Oakland, California
Michigan . . William H. Nush Company, Detroit, Michigan
Indiana, Wisconsin . . Neff Engineering Company, Ft. Wayne, Indiana
Northern Illinois, Eastern Iowa: Walter Norris Engineering Co., Chicago, Ill.
Northern Ohio: F. & W. Ureen Company, Cleveland, Ohio

IN CANADA

Province of Ontario . . . . . John Best Associates, Toronto, Ontario
Eastern Canada . . . Cowper Company Ltd., Montreal, Quebec

● Blowing a direct stream of air, or air and solvent, is the quickest and most efficient way to remove lint, fly, and foreign matter from textile mill equipment.

To connect the air hose at a HANSEN-equipped station, simply push the plug into the socket . . . air is automatically available at the blow gun. Slight movement of the coupling sleeve releases the plug, and flow is instantly shut off at the station.

Air stations at convenient locations equipped with HANSEN quick-connective shut-off couplings make it a simple matter to move from station to station with a short hose and HANSEN Air Blow Gun. Change-over from air blow gun to solvent spray cleaner takes only a few seconds.

Get more information about this efficient cleaning method by writing for catalog and details today.

QUICK CONNECTIVE FLUID LINE COUPLINGS . . .

THE HANSEN MANUFACTURING COMPANY

4031 WEST 150th STREET • CLEVELAND 11, OHIO

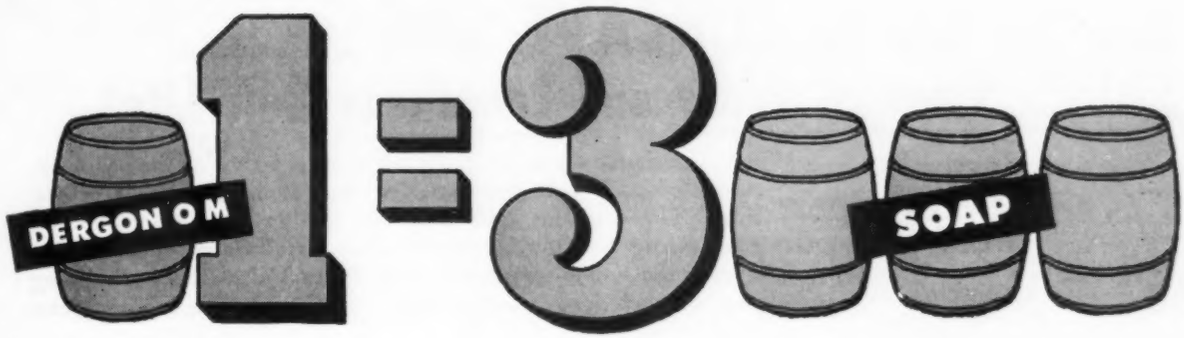
TO OVERCOME RISING COSTS:

REPLACE SOAP WITH

DERGON O M

(Reg. U. S. Pat. Off.)

for scouring all types of fabrics, woolens, cottons, rayons, and all knitted fabrics, including hosiery



DERGON O M IS A HIGHLY EFFICIENT DETERGENT AND A POWERFUL OIL EMULSIFIER

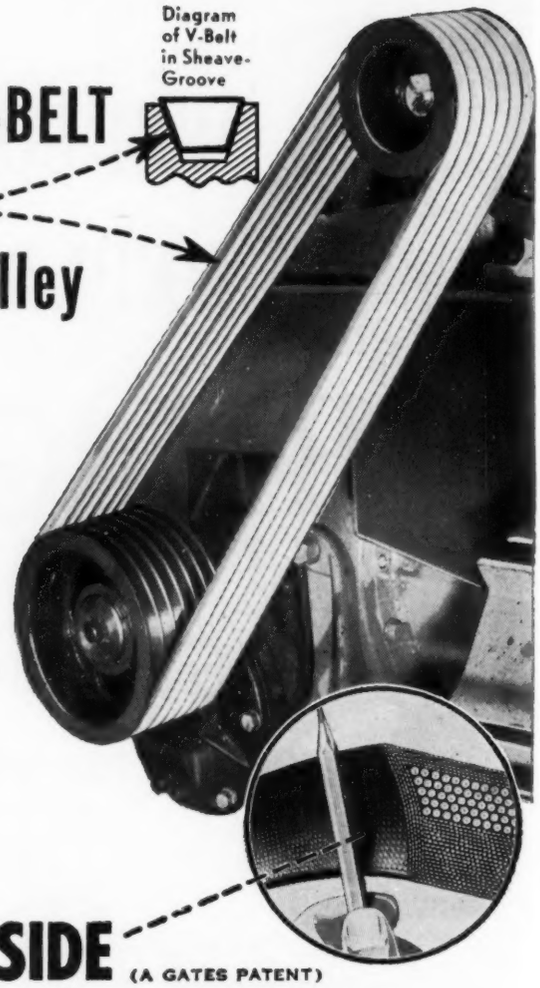
WRITE FOR INFORMATION OR DEMONSTRATION

ARKANSAS CO., INC.

NEWARK, NEW JERSEY

MANUFACTURERS OF INDUSTRIAL CHEMICALS FOR OVER 40 YEARS

The SIDE of a V-BELT is what GRIPS the pulley



Naturally, it GETS the WEAR!

Any one familiar with V-Belt drives knows that the sides of a V-Belt are what really get the wear.

It's the *sides* that grip the pulley. They *pick up* all the power from the driver pulley, *transmit* that power to the belt as a whole and then, once more, they *deliver* the power to the driven pulley. And, clearly, it's the *sides*—and *only* the sides—that take the wear against the sheave-groove wall.

That is why you have always noticed that the *sidewall* of the *ordinary* V-Belt is the part that *wears out first*—and, naturally, if you prolong the life of the sidewall, you *lengthen* the *life* of the *belt!*

Now See How the CONCAVE SIDE (A GATES PATENT) SAVES Sidewall Wear and Lengthens Belt Life!

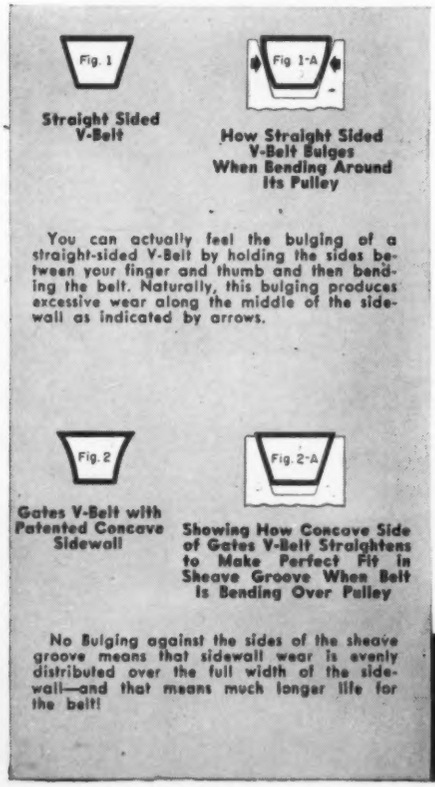


Fig. 1
Straight Sided V-Belt
Fig. 1-A
How Straight Sided V-Belt Bulges When Bending Around Its Pulley
You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.
Fig. 2
Gates V-Belt with Patented Concave Sidewall
Fig. 2-A
Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt Is Bending Over Pulley
No Bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!

The simple diagrams on the left show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the *middle* of the sides. The diagrams show also why the Patented Concave Side greatly *lengthens the life* of the *sidewalls* of Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belt can possibly give.

Saving SIDEWALL WEAR is more important NOW than ever before. ..

Now that Gates *SPECIALIZED* Research has resulted in Super Vulco Ropes capable of carrying much heavier loads—fully 40% higher horsepower ratings—the sidewall of the belt is called upon to do even more work in transmitting these heavier loads to the pulley. Naturally, with heavier loading on the sidewall, the life-prolonging Concave Side is more important now than ever before!

Gates
THE MARK OF SPECIALIZED RESEARCH

THE GATES RUBBER COMPANY *Denver, U. S. A.*
"The World's Largest Makers of V-Belts"

487

GATES VULCO ROPE DRIVES
Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

What influences major equipment builders to use ROSS "BCF" EXCHANGERS regularly for small to medium size installations

STANDARDIZED, COMPACT DESIGNS

LOW-COST, MASS PRODUCTION

CONTINUALLY CARRIED IN STOCK

Regardless of the make, there's one point on which most manufacturers of major equipment, their dealers and customers agree: *The Ross "BCF" unit is by far the most ideally suited for small to medium size oil or water cooling requirements.*

Primarily, they like the high heat transfer efficiency packed into this compact, standardized shell and tube design; the rugged yet lightweight construction; the permanent, leakproof, mechanically made tube joints; the straight, easily cleanable tubes; and the provisions for simple installation.

Secondly, but of equal importance, they like the low-cost, mass production . . . the constant availability from stock on 24 hours notice, if necessary.

No wonder then, that it's becoming a habit with buyers of major equipment to ask: "Is a Ross 'BCF' being furnished?" You'll ask the same question if you're familiar with all the features, and you *can* be by writing for *BULLETIN 4922* today!

ROSS

"BCF" EXCHANGERS

Ross Heater & Mfg. Co., Inc.

Division of American Radiator & Standard Sanitary Corporation

1461 WEST AVE. BUFFALO 13, N. Y.

Represented in Canada by Horton Steel Works, Ltd., Fort Erie, Ont.

MOST WIDELY USED OIL AND WATER COOLERS FOR DIESELS . . . GASOLINE ENGINES . . . TURBINES . . . REDUCTION GEARS . . . COMPRESSORS . . . HYDRAULIC PRESSES . . . THRUST BEARINGS . . . HYDRAULIC COUPLINGS . . . TORQUE CONVERTERS . . . INJECTION MOLDING AND DIE CASTING MACHINES

YOUR CARDS . . .

Are They Paying Good Dividends?

Your cards are an investment. Like security investments they should pay good dividends but unlike securities you can't turn them over for a quick capital gain. Therefore the only way to make cards profitable is to keep them in good condition and operating as continuously as possible.

Good card clothing is an essential to good carding. To *keep* this clothing in a condition that will make your production profitable use Ashworth Card Surveys at regular intervals. They are made by practical card men who inspect all card clothing, chains and bearings and report to you in writing.

With this information on hand, you can make preventive repairs and replacements, scheduling them so as to involve a minimum loss of productive time and to spread out the cost.

Ashworth has a COMPLETE line of card clothing products to supply your needs. With 3 factories, 6 repair shops, and 7 distributing points we can give efficient service.

Write or call us at Fall River and arrange for a survey of your cards.

ASHWORTH BROS., INC.

AMERICAN CARD CLOTHING CO. (Woolen Div.)

Fall River*†‡ Worcester*‡ Philadelphia*†‡ Atlanta†‡
Greenville†‡ * Charlotte†‡ Dallas†‡ (Textile Supply Co.)

**Factory* *†Repair Shop* *‡Distributing Point*

PRODUCTS AND SERVICES

Card Clothing for Cotton, Wool, Worsted, Silk, Rayon and Asbestos Cards and for All Types of Napping Machinery. Brusher Clothing and Card Clothing for Special Purposes. Lickerin Wire and Garnet Wire. Sole Distributors for Platt's Metallic Wire. Lickerins and Top Flats Reclothed.

Ashworth PIONEERS IN CARD CLOTHING

4 FACTORIES • • • 6 REPAIR SHOPS • • • 7 DISTRIBUTING POINTS

The SMITH-DRUM Line of Textile Dyeing, Drying and Finishing Machines

For many years, most of the major advancements in these types of machines have been developed by Smith-Drum engineers. In these latest models, a number of improvements have placed them still further ahead in design and performance. This leadership in engineering has been steadily reflected in outstanding leadership in sales . . . year after year. When you purchase any Smith-Drum machine you can be sure that it is of the most advanced design, economical in operation and built of the finest materials to give long, trouble-free service. Complete information on any of these machines will be sent promptly upon request.

SMITH, DRUM & COMPANY, Allegheny Ave. at 5th St., Philadelphia 33, Pa.

Rotary Hosiery Dyeing Machine

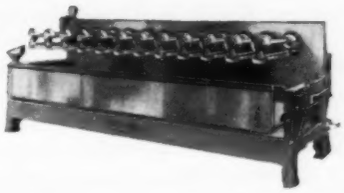
out of every 10 pairs of hosiery made the United States and Canada are yed in Smith-Drum machines.

Paddle Hosiery Dyeing Machine

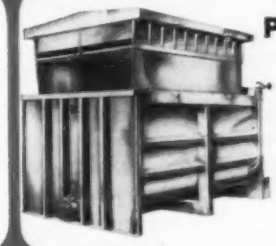
This popular machine is used in many of the leading hosiery mills in the United States and Canada.

kein Dyeing Machine

ompletely revolutionized kein Dyeing . . . now recogized as the only machine isfactory for fine count silk d rayon.

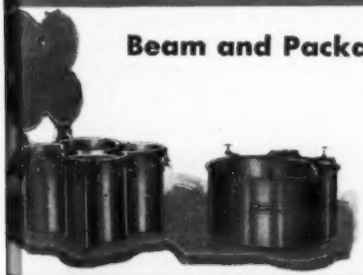


Pulsating Skein Dyeing Machine



For dyeing heavy woolen, worsted and cotton yarns. Intermittent flow of dye liquor keeps yarn free of snarls. Facilities are provided for reversing flow.

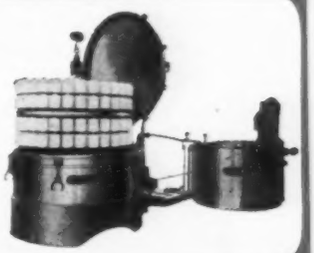
Beam and Package Dyeing Machine



Radically new type of machine for dyeing beams or packages insures uniformity of results . . . plus real economies in operation.

Package Dyeing Machine

Most important installations of this type machine in recent years have been made by Smith-Drum.



Package Extractor

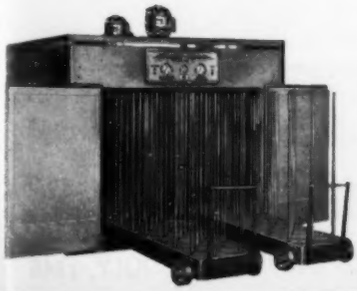
Provides more uniform extraction, without distortion of package. Reduces labor in loading and unloading.

Pressure Extracting Machine

Extracts packages with air, right on the carrier as removed from the dyeing machine. This machine is generally used in combination with port-type blower drying.

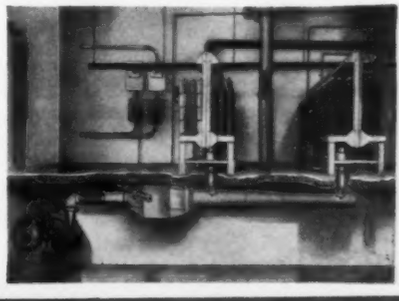
PACKAGE DRYING MACHINES

Cabinet Type

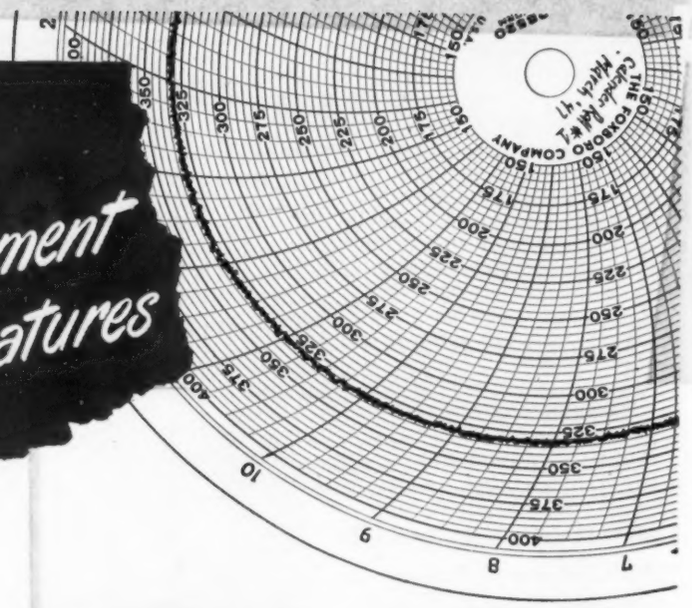


Port Type

Table Type



Now! Continuous Measurement of Roll Surface Temperatures

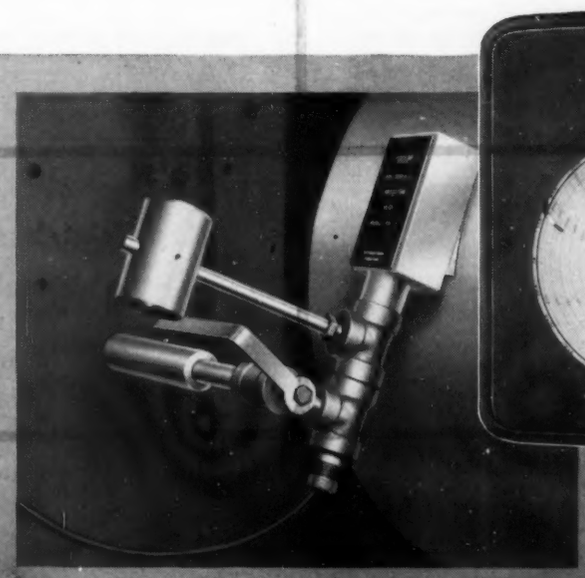


A UNIQUE, NEW FOXBORO SYSTEM

AN ENTIRELY NEW type of measuring head coupled with the sensitive, instantly-responding Dynalog Electronic Recorder solves a tricky problem of long standing. This combination has proven far more accurate—and convenient—in the continuous measurement of roll surface temperature than previous devices.

The Foxboro measuring element is very rugged, yet it bears so lightly (only 0.75 gm per sq. cm.) that it avoids any tendency to mark or score the roll. Errors due to friction, radiation, and convection, so common to conventional roll surface temperature bulbs, are completely avoided. Errors and inconveniences arising from use of hand-held surface pyrometers are eliminated. Recorder may be located up to 1000 feet away, connected with electric cable.

Using either a Dynalog Recorder or Controller, this is the system to install wherever closer, continuous measurement or control of roll surface temperatures means a saving in steam, a reduction in waste, a more uniform product. Get complete details—Bulletin 405. **The Foxboro Company, 18 Neponset Avenue, Foxboro, Mass., U. S. A.**



Foxboro Dynalog Controller at far right. Installation photo shows New Sensitive Element—basically, a miniature resistance bulb having highest sustained accuracy of any temperature measuring element within its range. Accuracy of readings is protected by complete isolation of element from ambient and radiant temperature effects. High speed response to roll surface temperature changes. Operating range: −40°F. to +350°F. or higher under special conditions.

FOXBORO
REG. U. S. PAT. OFF.

RECORDING · CONTROLLING · INDICATING
INSTRUMENTS

The Other Day we were talking with a mill operator—one of the most successful weavers of rayon in the industry...

HE TOLD US

He has operated 450 looms equipped with Hyatt Roller Bearings on crankshafts, cam shafts and rocker shafts 24 hours per day—continuously for 8 years—without a single bearing replacement or one minute lost for bearing maintenance. The bearings have been lubricated only 6 times per year.

Think of the saving in lubrication and maintenance alone... not to mention 10% power saving... the ease of turning the loom over by hand... plus accurately maintained bobbin transfer due to lay staying properly positioned.

He expected such service from Hyatt Roller Bearings because he has about 1000 additional Hyatt equipped looms which have given the same kind of performance for 12 years!

WE TOLD HIM

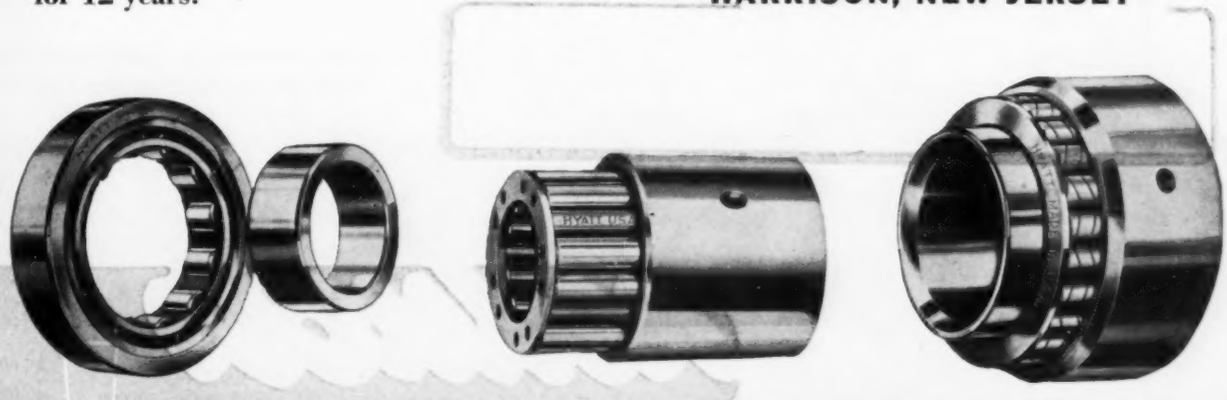
More and more smart operators are following his wise example and one well-known loom builder has adopted Hyatts as standard equipment in his latest rayon loom.

Now the mill operator may also have his looms equipped with Hyatts on take-up roll, yarn beam and vibrating whip roll... thereby reducing thick and thin spots, lessening barre effect, preventing sticking rolls, insuring even warp yarn tension.

Specify Hyatt Roller Bearings when you buy new looms.

WRITE! *For information about Hyatt Roller Bearings for looms, preparatory and finishing machines of all kinds. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.*

HYATT BEARINGS DIVISION
General Motors Corporation
HARRISON, NEW JERSEY



HYATT ROLLER BEARINGS

HYMOLON "K"

100% ACTIVE

Synthetic Detergent

STABLE

HYMOLON K is stable in hard water, acids and alkalis and is compatible with soap. It prevents scum formation and promotes more level dyeing. Hymolon K is a *liquid* detergent and as such is preferred for ease of handling and use.

ECONOMICAL

HYMOLON K is 100% active, contains no water, salts or cheap alkalies, and shows about 4 times the scouring of a good soap. Accordingly, there is less material to ship and handle. Hymolon K economically combines in one product good wetting-out and excellent detergency. The concentration required varies with the type of operation, usually 0.1 to 0.4% on the weight of the goods.

VERSATILE

HYMOLON K is recommended for scouring and dyeing operations for all types of textile fibers; for unsurpassed detergency of all forms of woolens; and for the kier boiling of cotton. It gives a heavy, continuous, foamy bath and is especially useful in cleaning operations where emulsification and dispersion of spinning waxes or oils are of importance.

Hartex Products

Rayon Oils & Sizes	Conditioning Agents	Cationic Softeners
Nylon Oils & Sizes	Scrooping Agents	Cotton Warp Dressings
Kier Bleaching Oils	Splashproof Compounds	Wetting-Out Agents
Finishing Oils	Delustrants	Weighting Agents
Synthetic Detergents	Leveling Agents	Mercerizing Penetrants

HART PRODUCTS CORPORATION
1440 Broadway, New York, N. Y.

Hart Products

based on research

1898 1948

50 th ANNIVERSARY

means
a Half-Century of progress
in the betterment
of
Loom Harness
Equipment

Ste-hed-co

Flat Steel Heddles — Loom Frames — Loom Reeds — Warp Preparation Equipment — Shuttles and Loom Harness Accessories

are all the result of the research devoted to understanding the needs of the mill in producing fabrics second to none.

Are you taking full advantage of the facilities, experience and knowledge that our Fifty Years in manufacturing equipment for the Textile Industry have to offer.

STEEL HEDDLE MFG. CO.

2100 W. ALLEGHENY AVE., PHILADELPHIA 32, PA.

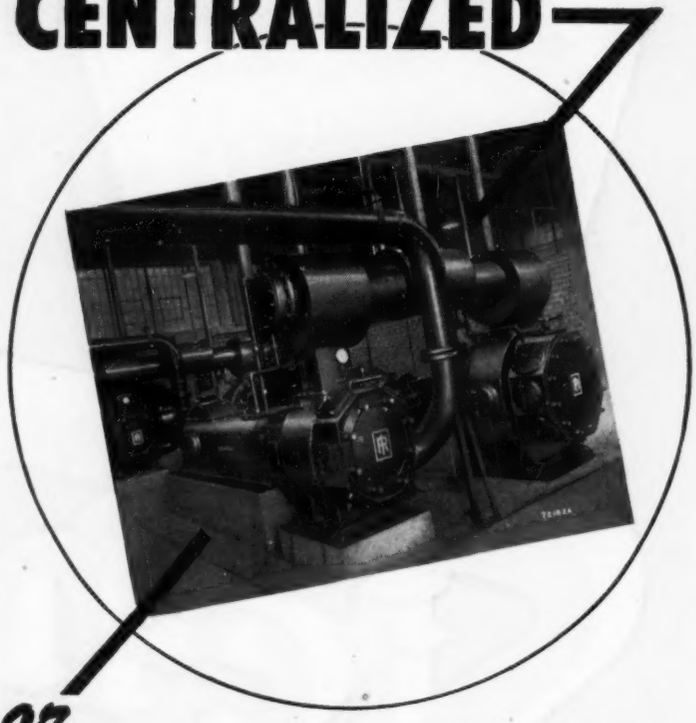
and SOUTHERN SHUTTLES DIVISION

621 E. McBEE AVE., GREENVILLE, S. C.

Other Offices and Plants

Atlanta, Ga. • Greensboro, N.C. • Providence, R.I. • Montreal, Can.

Should your AIR-POWER *system be* CENTRALIZED *or* DECENTRALIZED?



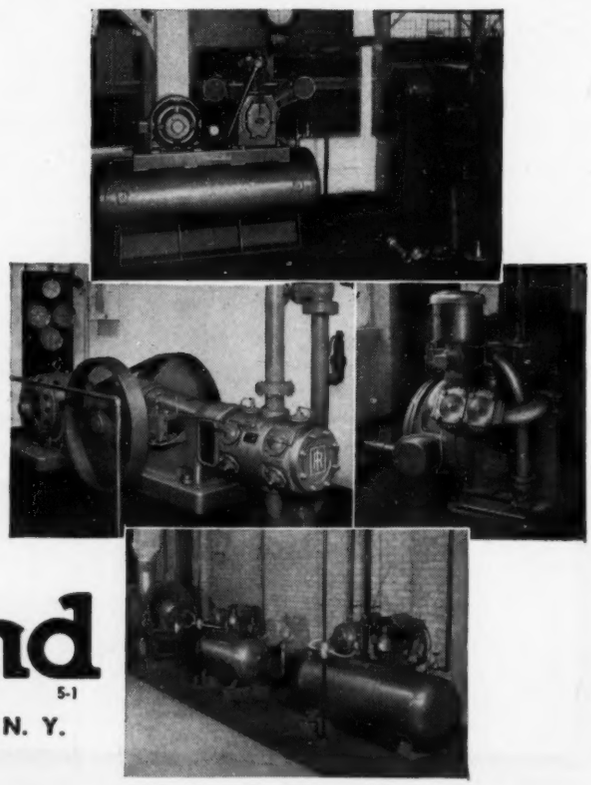
If you have a shop where you need Air Power at scattered or isolated spots, your first impulse may be to install a decentralized source of Air Power . . . a small compressor at each location. But before doing this, consider these points:

Flexibility — **Load Factor**
Power Rate — **Piping System**
First Cost — **Attendance**
Installation — **Maintenance**

For example, during certain hours, seasons, or cycles, the maximum demand for air may shift from one part of your plant to another. If you had a central compressor plant with an adequate piping system, the full capacity of your entire plant could be made available to *any* section of the shop at *any* time. You may find that part of shop should have a centralized system, the other decentralized, or a combination of both systems.

• • •

When you plan a new plant or an extension, or feel that it's time to modernize your system, call in an Ingersoll-Rand engineer. He's an Air-Power Specialist, and represents a company that builds a complete line of compressors . . . for centralized, decentralized, or combination systems . . . sizes from ½ to 3000 horsepower . . . air-cooled and water-cooled types . . . pressures from vacuums to 15,000 psi. . . . drives by electric motor or built-in steam, gas, or diesel engines.



COMPRESSORS • AIR TOOLS • ROCK DRILLS
TURBO BLOWERS • CONDENSERS
CENTRIFUGAL PUMPS • OIL AND GAS ENGINES

Ingersoll-Rand

5-1

11 BROADWAY, NEW YORK 4, N. Y.

Proper Carding Benefits the Whole Mill

with TUFFER CARD CLOTHING

You Get Production Off to the Right Start

The Tufferizing Process— developed and exclusively owned and used by Howard Bros.— cuts and forms wires with an accuracy never before obtained in the making of card clothing. The wires are formed with precision and placed accurately in the famous Tuffer Foundation . . . when drawn on the cylinder they fit snugly — *sides perfectly parallel and every point in place.*

WITH precision-made Tuffer Card Clothing on your cards, you get production off to the right start—raw stock losses are reduced to a minimum and the fine, even web, so necessary for spinning and weaving, is obtained.

Wise management realizes that the money invested in maintaining its card clothing at top efficiency pays off profitably in high quality production and economical operation. The benefits derived from proper carding are felt throughout the entire mill.

Talk over your carding problems with a Howard Bros. representative. You'll find it will prove worth while.

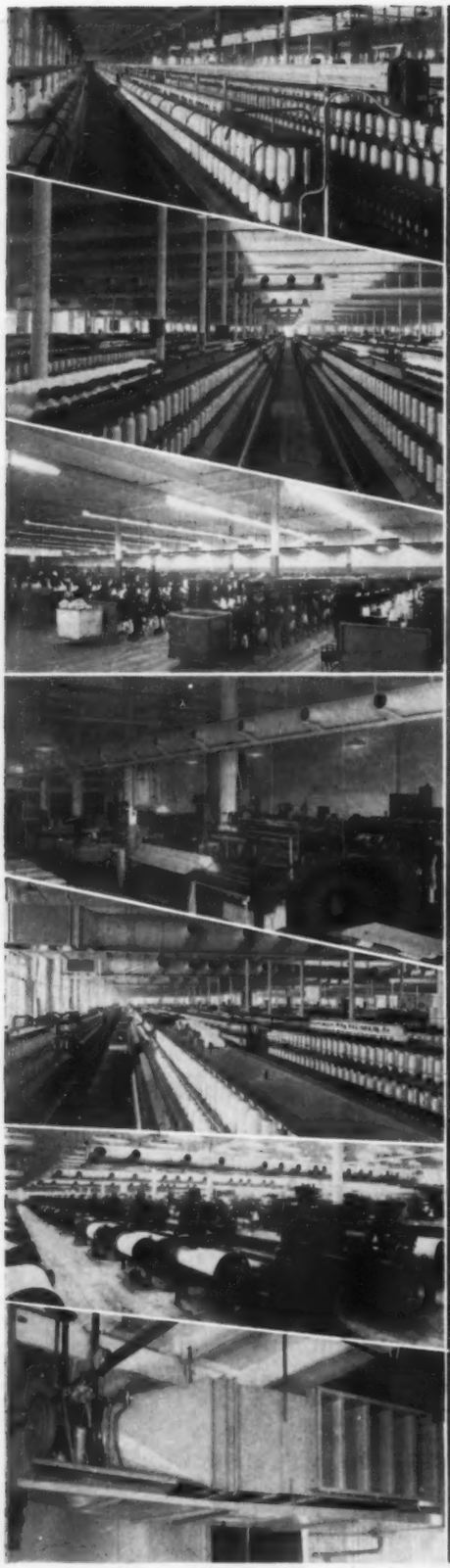
HOWARD BROS. MFG. CO.
WORCESTER 8, MASSACHUSETTS

Southern Plants: Atlanta, Ga. and Gastonia, N. C. **Branches:** Philadelphia, Pa. and Blanco, Texas
Direct Representation in Canada

A-7

TUFFER CARD CLOTHING

IMPROVES PRODUCTION ALL ALONG THE LINE



INDUSTRIAL AIR CONDITIONING

Featuring

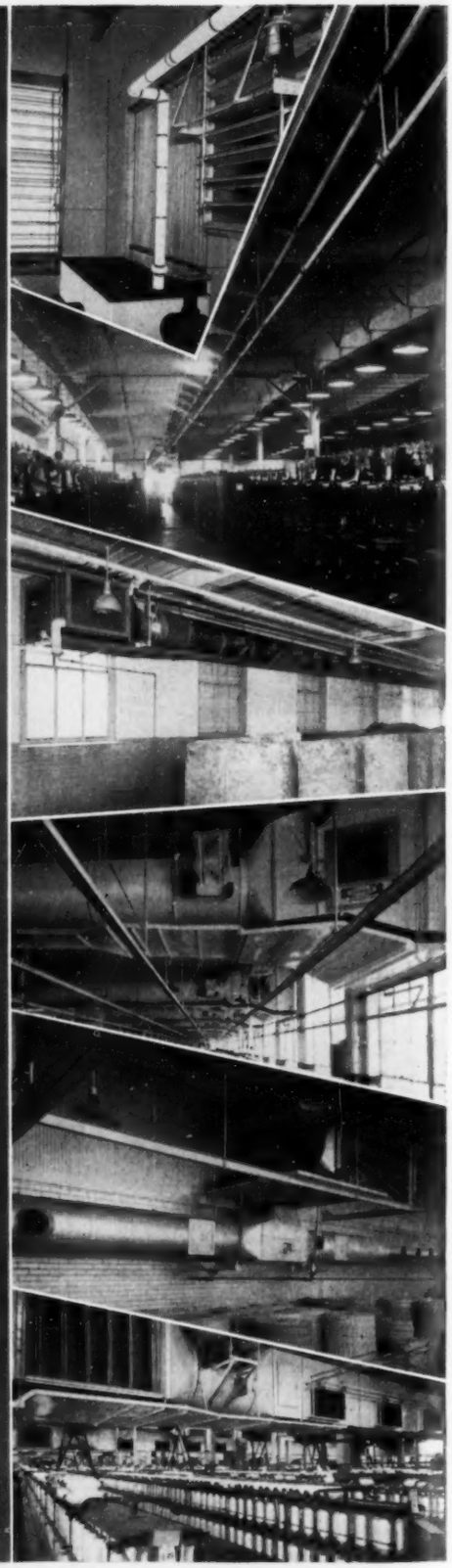
FLEXIBILITY
ECONOMY
DEPENDABILITY

For 33 years The Bahnson Company has pioneered in the development of industrial humidifying and air conditioning equipment.

At the same time, The Bahnson Company has built an organization of engineers, installation and service personnel which enables us to offer our products as part of a complete air conditioning service.

In tailoring our installations to meet specific problems on thousands of industrial jobs, we have been guided by three principles: Flexibility—Economy—Dependability.

Write for Bulletin No. 333



Bahnson System

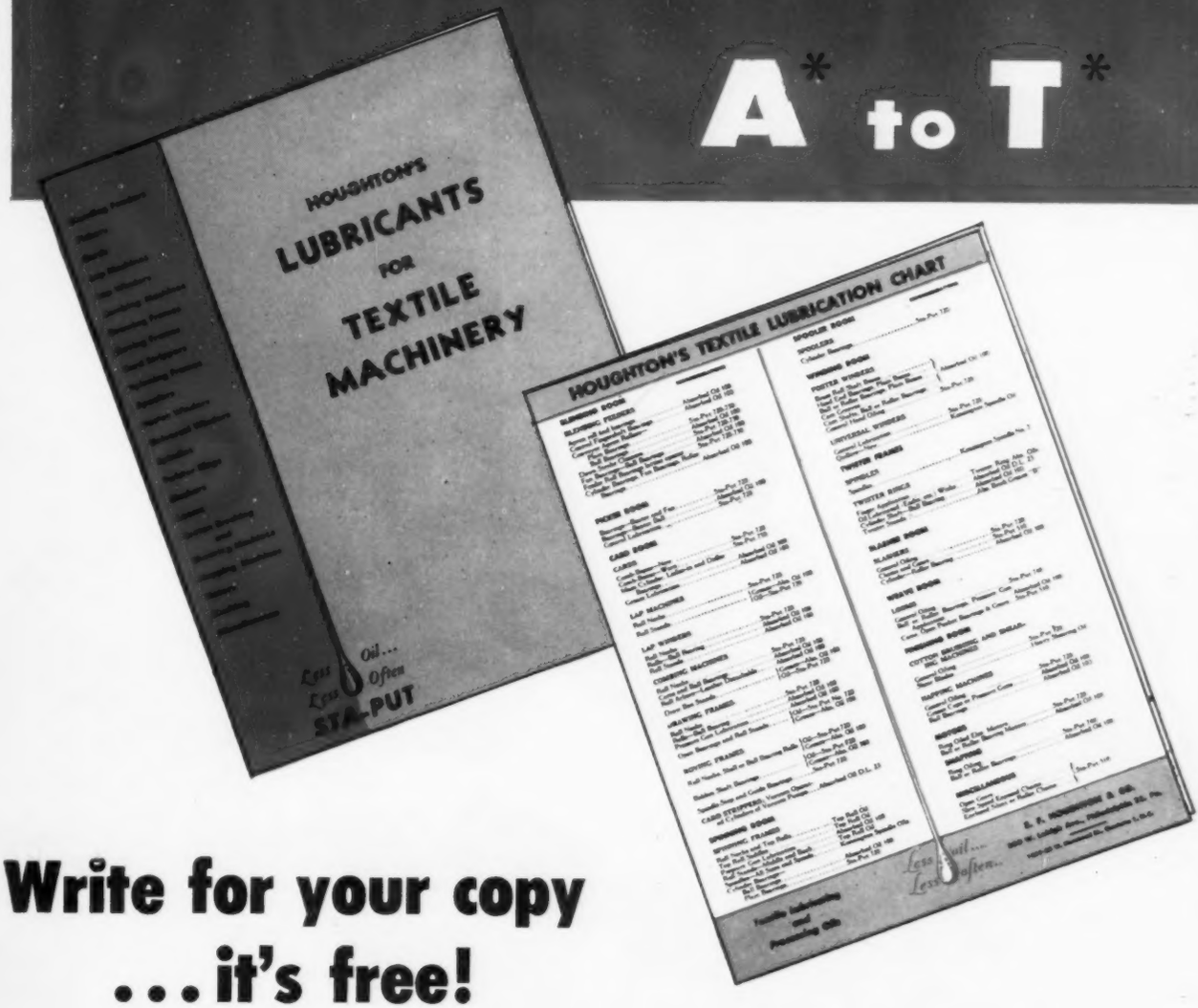
POSITIVE CIRCULATION · LOWER OPERATING COST

AIR CONDITIONING ENGINEERS

THE BAHNSON CO WINSTON-SALEM, N. C.

886 Drewry St., Atlanta, Ga. 93 Worth St., New York City W. J. Westaway Co., Ltd., Hamilton, Ontario 703 Embree Crescent, Westfield, N. J. A-3 Virginian Apts., Greenville, S. C. 553 S. Figueroa St., Los Angeles, Cal.

Covers every lubrication need from A* to T*



Write for your copy ...it's free!

Any textile machine will last longer and produce more if lubricated correctly. There's a Houghton "fortified" lubricant for every application, from *Apron Roll and bearings to *Twister Frames.

The new folder shown above tells you why, how and where. A complete chart showing the proper oil or grease for each application is included. To get it, ask The Houghton Man, or use the coupon.

E. F. HOUGHTON & CO.
303 W. Lehigh Avenue
Philadelphia 33, Pa.

Please send me a copy of your new textile "lube" folder.

Name_____

Title_____

Company_____

Address_____

_____

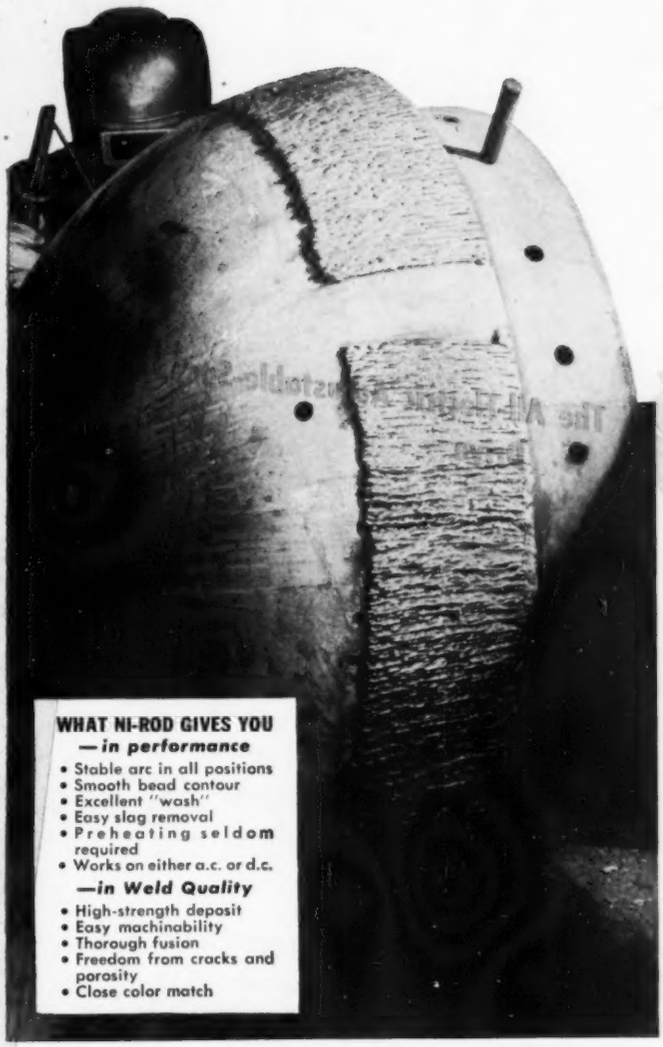
Many cotton mills have found it profitable to consult Corn Products textile laboratory at Greenville, South Carolina.

The services of our technicians are offered textile manufacturers without obligation.

CORN PRODUCTS SALES COMPANY

Greenville, S. C. • Greensboro, N. C. • Atlanta, Ga.

If it's CAST IRON you can weld it with NI-ROD



WHAT NI-ROD GIVES YOU

—in performance

- Stable arc in all positions
- Smooth bead contour
- Excellent "wash"
- Easy slag removal
- Preheating seldom required
- Works on either a.c. or d.c.

—in Weld Quality

- High-strength deposit
- Easy machinability
- Thorough fusion
- Freedom from cracks and porosity
- Close color match

NI-ROD WELDING ELECTRODES SUCCESSFULLY BUILT UP THIS WORN DIE

Dished heads are just one of the products of Lukens Steel Company, Coatesville, Pa.

They're formed with large hemispherical dies. Dies made of cast iron. Dies that are fairly expensive. When one wears down, Lukens' maintenance men try to restore the original contours.

For several years Lukens had used brazing to build up the worn areas. Then they tried Ni-Rod* welding electrodes because of good reports on its strength and easy machinability.

Here's what Lukens has to say about this repair job:

> **"With other wires, it was found that welds would pull loose from the casting when in use. Ni-Rod was the only electrode that could be used successfully. It would not pull loose when in operation, and had a very good wearing quality. We now use Ni-Rod for building up dies to insure good wear and where pressure on the die is involved."**

The welded die (before machining) is shown at the left. Note the smooth layer of Ni-Rod beads. Proof of Ni-Rod's easy handling!

*Reg. U. S. Pat. Off.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

TRY NI-ROD AT OUR EXPENSE!

Prove to yourself that Ni-Rod has taken cast iron welding out of the "hit-or-miss" class.

Send in the coupon and get 3 free electrodes. Try 'em on any cast iron job you have. See if they're not the easiest-handling electrodes you ever used to weld cast iron.

Time and time again, Ni-Rod can save you money in repairing damaged iron castings; in building up worn areas; in correcting machining errors; on the production line to join cast iron to steel.

SEND IN COUPON TODAY ➡

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

Gentlemen: I'd like to try Ni-Rod welding electrodes. Please send me 3 free rods of the diameter I have checked.

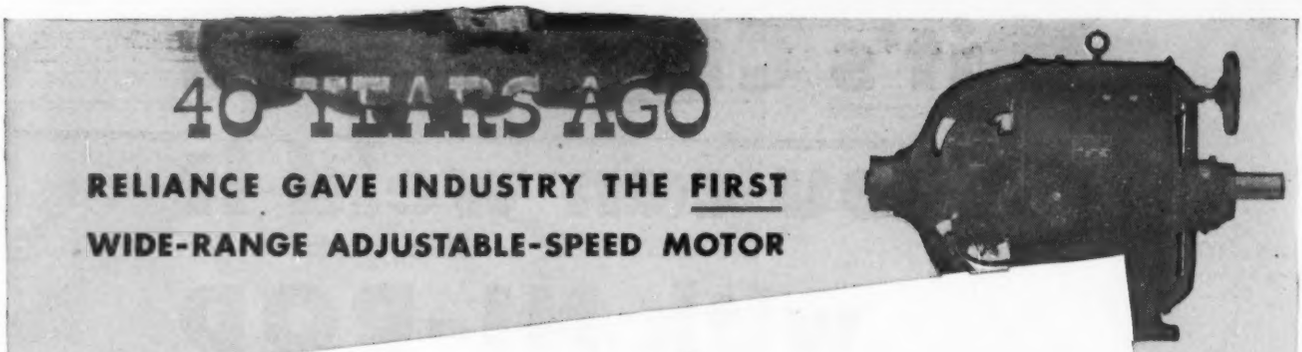
☐ 3/32" ☐ 1/8" ☐ 5/32" ☐ 3/16"
(Please check *one* size only)

Name .....

Company ..... T.I. 7-48

Address .....

City ..... State .....



40 YEARS AGO

RELIANCE GAVE INDUSTRY THE FIRST

WIDE-RANGE ADJUSTABLE-SPEED MOTOR

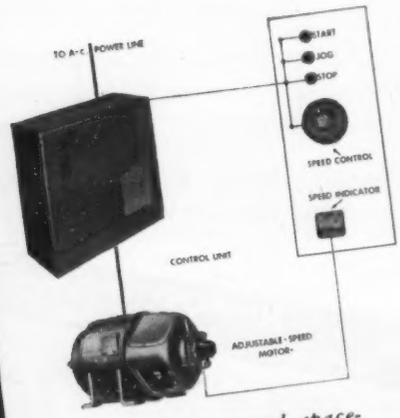
Today.. RELIANCE V★S DRIVE offers

WIDER SPEED RANGES FROM A-c. CIRCUITS

. . . plus synchronized multi-motored operation, controlled acceleration and deceleration . . . greater flexibility

RELIANCE V★S DRIVE

The All-Electric Adjustable-Speed Drive for A-c. Circuits



Conveniently-packaged, space-saving V★S Drives are available from 1 to 200 hp. Two or more Motors may be operated simultaneously from a single Control Unit.

In a great variety of applications throughout industry, Reliance V★S Drives have so stepped up production and trimmed costs they have paid for themselves many times over. Plants everywhere now vote V★S the simplest, most effective and most economical means ever developed for providing adjustable speeds from A-c. circuits. That's why it will pay you to investigate the possibilities of V★S by writing today for the *new* Bulletin 311.

RELIANCE ELECTRIC & ENGINEERING CO.

1085 Ivanhoe Road • Cleveland 10, Ohio

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Denver • Detroit • Gary • Grand Rapids • Greenville, S. C. • Houston • Kansas City
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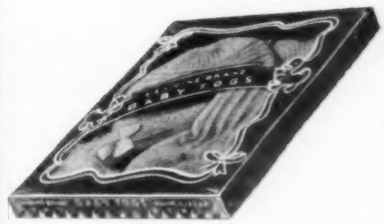
RELIANCE A-C D-C MOTORS

"Motor-Drive is More Than Power"

Visit our booth at Western Packaging Show, San Francisco, August 10-13.

LET MR. CELLOPHANE GUIDE YOU TO BETTER PACKAGING

THE QUALITIES you need for successful packaging are engineered into Sylvania Cellophane. Every step in its manufacture is carefully checked to assure you of maximum dust, grease and moistureproofness. This careful control assures Sylvania Cellophane's uniform transparency and strength . . . low temperature durability . . . heat sealing qualities . . . excellent printing surface.



Here's a natural for baby. Sanitary, dustproof overwrap assures cleanliness . . . makes an attractive package that's tops in sales appeal.

SYLVANIA CELLOPHANE

SYLVANIA DIVISION AMERICAN VISCOSE CORPORATION

Manufacturers of cellophane and other cellulose products since 1929

General Sales Office: 350 Fifth Avenue, New York 1, N.Y. *Plant:* Fredericksburg, Va.

How do you like your DRAWING FRAMES? Standard? Medium? Wide or Extra Wide?

MEDLEY DRAWING FRAMES

...fit any requirement in drawing!

The Medley "8 Ends Up," or the conventional 6 ends up drawing frames are available in standard, medium, wide, and extra wide construction and will fill your every drawing requirement. Quickly and easily, Medley drawing frames can be adapted to draw fibers in staple lengths from 5/8 inch up to 13 inches.

Medley precision Drawing features the sealed-in ball-bearing top roll with permanent, sealed-in lubrication. Every day this more efficient drawing is producing a more uniform, grease-free sliver in mills throughout the industry.

Wire or write today for complete information about how to change over your present drawing to Medley—or if you have other problems in any phase of textile manufacture, call Medley for the services of a trained mechanical or textile engineer.

Medley Has It or Medley Will Make It!

The MEDLEY System, Inc.

400 32nd ST., COLUMBUS, GEORGIA

Medley Manufacturing Co., Columbus, Ga. • Gastonia Roller, Flyer & Spindle Co., Gastonia, N. C. • Allan Textile Machine Co., Pawtucket, R. I

Boy Scouts from an Avondale community.
Painted from life by Douglass Crockwell – Number 13 of a Series.

Self-reliance . . . can it be woven of fabric?

Was there ever a greater moment in a boy's life?

He sets forth on adventure.

And he ends up a better, self-reliant citizen!

Seven thousand of us here at Avondale Mills produce good cotton fabrics for America . . . by the millions of yards every year.

But we also want to do everything within our power to help produce more self-reliant citizens for America.

That is why we give every boy eligible to be a Boy Scout that opportunity.

That is why we open three of our own Avondale vacation camps to the Boy Scouts. (One is in Florida, on the Gulf Coast. One is in the mountains, at a lake. One is on the Coosa River, here in Alabama.)

That is why, too, our President is also Vice-President of the Choccolocco Scout Council, and why nearly fifty of us at Avondale Mills are Scout Masters.

This making of better citizens seems to us a natural part of our "Partnership-with-people". From this working "partnership" come many benefits. Both for us and for you.

For us: *Incomes as high as any in the nation's textile industry . . . Production rates as high as any and unit labor costs constantly decreasing* . . . And for you: *Better cotton yarns and fabrics at prices to fit your budgets!*

Thus we hope to weave better fabrics, and better self-reliant young citizens . . . for America!

Next month we would like to make a statement to you on Independence.

Avondale
MILLS OF ALABAMA
GENERAL OFFICES: SYLACAUGA, ALABAMA

FOUNDED IN 1897 BY GOVERNOR B. B. COMER

AVONDALE SPINS THE YARN AND WEAVES THE FABRICS THAT GO INTO THE HOME FOR EVERY MEMBER OF YOUR FAMILY

Above is reproduced an ad originally appearing in
THE SATURDAY EVENING POST — MARCH 20TH

41

Years

★

AS ELECTRICAL CONTRACTORS
TO THE TEXTILE INDUSTRY

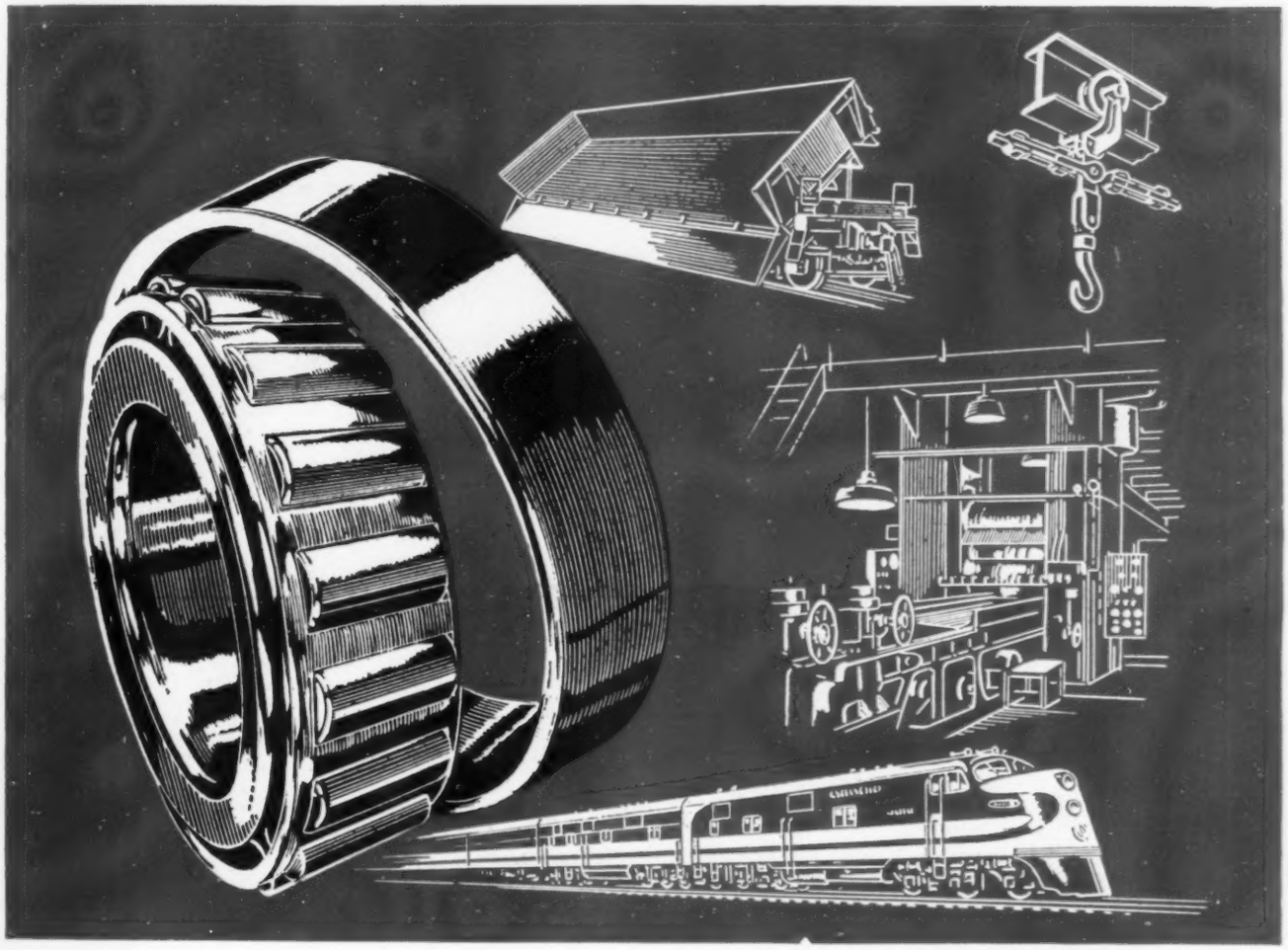
★

J. M. CLAYTON COMPANY

Contracting Electrical Engineers

ATLANTA, GEORGIA ESTABLISHED 1907

YES! Tycol Acylkup Greases perform better . . . BETTER . . . BETTER



Tycol Acylkup Greases perform better because:

. . . *Tycol Acylkup Greases* are made from finest quality cylinder stocks and refined neutral oils, combined with a minimum of soap.

. . . *Tycol Acylkup Greases* are engineered to take it. They assure maximum performance.

. . . *Tycol Acylkup Greases* keep bearings smooth running and cool.

. . . *Tycol Acylkup Greases* supply the "film of protection" needed to give power a chance to produce.

Complete information on Tycol Acylkup Greases is available from your nearest Tide Water Associated Office. Write, wire, or phone today.

TYCOL
INDUSTRIAL LUBRICANTS

Boston • Charlotte, N. C.
Pittsburgh • Philadelphia
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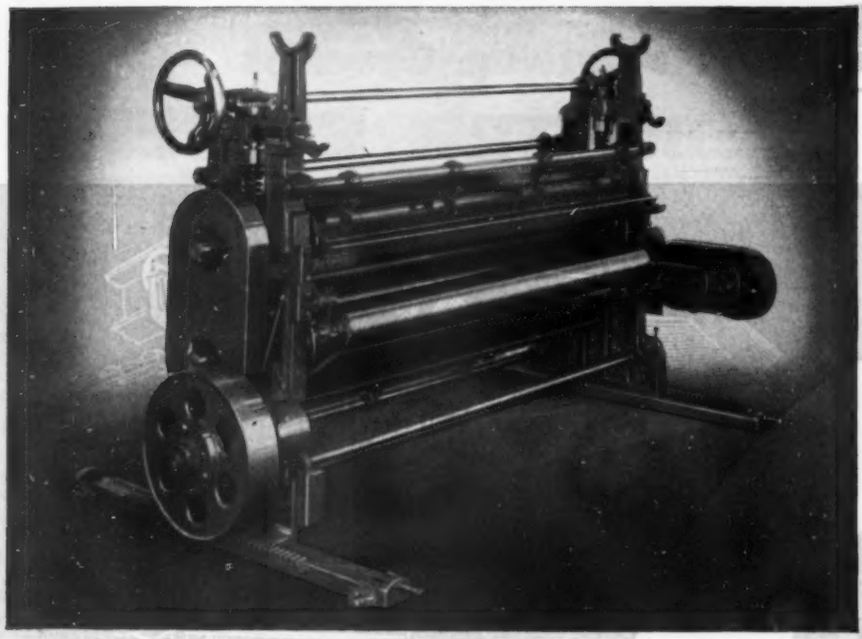
TIDE WATER ASSOCIATED OIL COMPANY
17 BATTERY PLACE · NEW YORK 4, N.Y.

LUBRICATION—"ENGINEERED TO FIT THE JOB"



● *Built by* DUESBERG-BOSSON OF AMERICA, INC., *Peralta Machines are fitted to woolen cards for crushing burrs and other foreign bodies to powder without injuring wool fibers.*

ON PERALTA MACHINES

In 1944, Duesberg-Bosson of America, Inc., standardized on SKF Bearings for Peralta Machines. Each of these machines depends upon four SKF Spherical Roller Bearings for rolling alignment, high capacity, equalized load distribution, low maintenance costs, and long life. When a machine is SKF-equipped, it's built for *profitable* performance. 6413

SKF INDUSTRIES, INC., FRONT ST. & ERIE AVE., PHILA. 32, PA.

SKF Puts the Right Bearing in the Right Place

SKF BALL AND ROLLER BEARINGS

3 SPECIFIC TYPES ... each for a definite purpose and all interchangeable

LUNKENHEIMER

150 LB. S.P. BRONZE GATE VALVES

FIG. 2150
Double Wedge Disc—Rising Stem. For use where the flexibility of the double disc is needed.

FIG. 2151
Solid Wedge Disc—Rising Stem. For use where the solid disc may be an advantage, as in food processing lines and handling gummy substances.

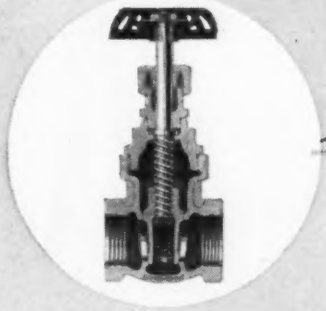
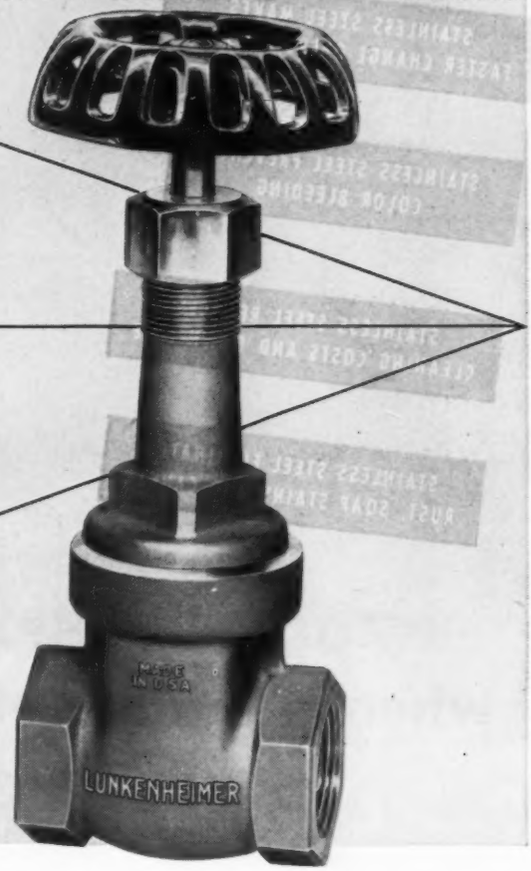


FIG. 2153
Single Wedge Disc—Non-Rising Stem. For installations where headroom is too restricted for rising stem valves.



PHONE YOUR DISTRIBUTOR FOR FOLDER

Design, construction and interchangeability are fully illustrated and described in Circular No. 574. Ask your distributor for a copy or write us direct.

• These new rugged designs meet all requirements for service where 150 lb. S.P. Bronze Gate Valves are used. They are engineered to provide a wide degree of interchangeability, making it possible to convert from one type to another by a simple interchange of trimmings. This means fewer valves and parts to stock, thus reducing maintenance expenses.

All three designs are equipped with Lunkenheimer patented wear-resistant alloy stem material which eliminates failures due to stem-thread wear.

Why not investigate the profit possibilities of these new valves in your plant—now.

ESTABLISHED 1862

THE LUNKENHEIMER CO.

"QUALITY"

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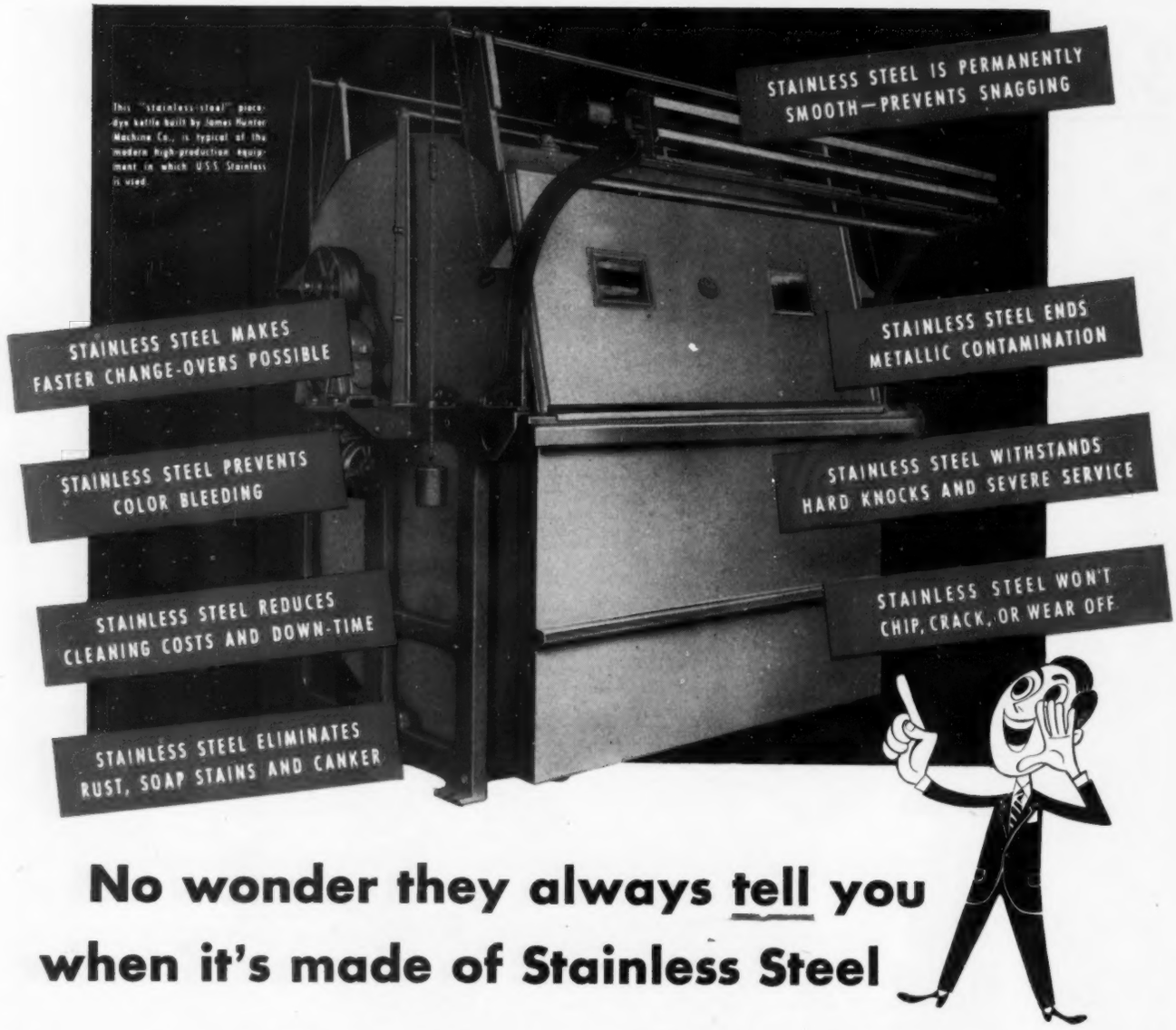
NEW YORK 13 CHICAGO 6 BOSTON 10 PHILADELPHIA 34

EXPORT DEPT. 318-322 HUDSON ST., NEW YORK 13, N. Y.


This "stainless-steel" pieced-dye kettle built by James Hunter Machine Co., is typical of the modern high-production equipment in which U·S·S Stainless is used.
STAINLESS STEEL IS PERMANENTLY SMOOTH—PREVENTS SNAGGING
STAINLESS STEEL MAKES FASTER CHANGE-OVERS POSSIBLE
STAINLESS STEEL ENDS METALLIC CONTAMINATION
STAINLESS STEEL PREVENTS COLOR BLEEDING
STAINLESS STEEL WITHSTANDS HARD KNOCKS AND SEVERE SERVICE
STAINLESS STEEL REDUCES CLEANING COSTS AND DOWN-TIME
STAINLESS STEEL WON'T CHIP, CRACK, OR WEAR OFF
STAINLESS STEEL ELIMINATES RUST, SOAP STAINS AND CANKER

No wonder they always tell you when it's made of Stainless Steel

WHENEVER they use Stainless Steel in their equipment, makers of textile machinery never fail to *emphasize* that fact. They know there's no quicker way to let you know that it is made of the best material available . . . that it won't rust or corrode, will prevent off-color runs, will reduce maintenance and repairs, and will out-last and out-perform other construction.

The money-saving advantages of Stainless Steel have been well proved in the past few years of high pressure operation. That is why in today's new equipment, especially designed to speed up mill operation, Stainless Steel is being used in greater amounts and in more places than ever before.

Although it costs more—Stainless Steel has shown that it can do so much more, do it so much better and lasts so much longer that it is, in many cases, by far the cheapest material to use. Particularly is this true when U·S·S Stainless Steel is used.

In this perfected, service-tested steel, equipment builders and equipment users are sure of obtaining all the superior properties of Stainless Steel at their *best*. Consistently uniform, of fine finish, excellent in fabricating qualities, U·S·S Stainless responds readily and uniformly to the most advanced manufacturing techniques . . . insures the finest results in service. So if you want top performance from your equipment just add "U·S·S Stainless preferred" on your next equipment order. More than likely your equipment builder already uses it, but it pays to be sure.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND, CHICAGO & NEW YORK
CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO · NATIONAL TUBE COMPANY, PITTSBURGH
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

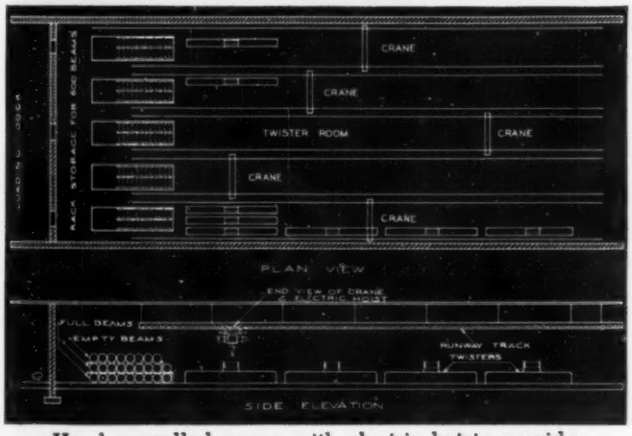
USS UNITED STATES STEEL

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

8-732

UNITED STATES STEEL



Hand-propelled cranes with electric hoists provide complete handling service for the entire twister room.

In the ultra-modern twister room of the Excelsior Mills, Clemson, S. C. a Cleveland Tramrail system handles rayon beams from storage to twisting machines. Empty beams are returned on the same equipment.

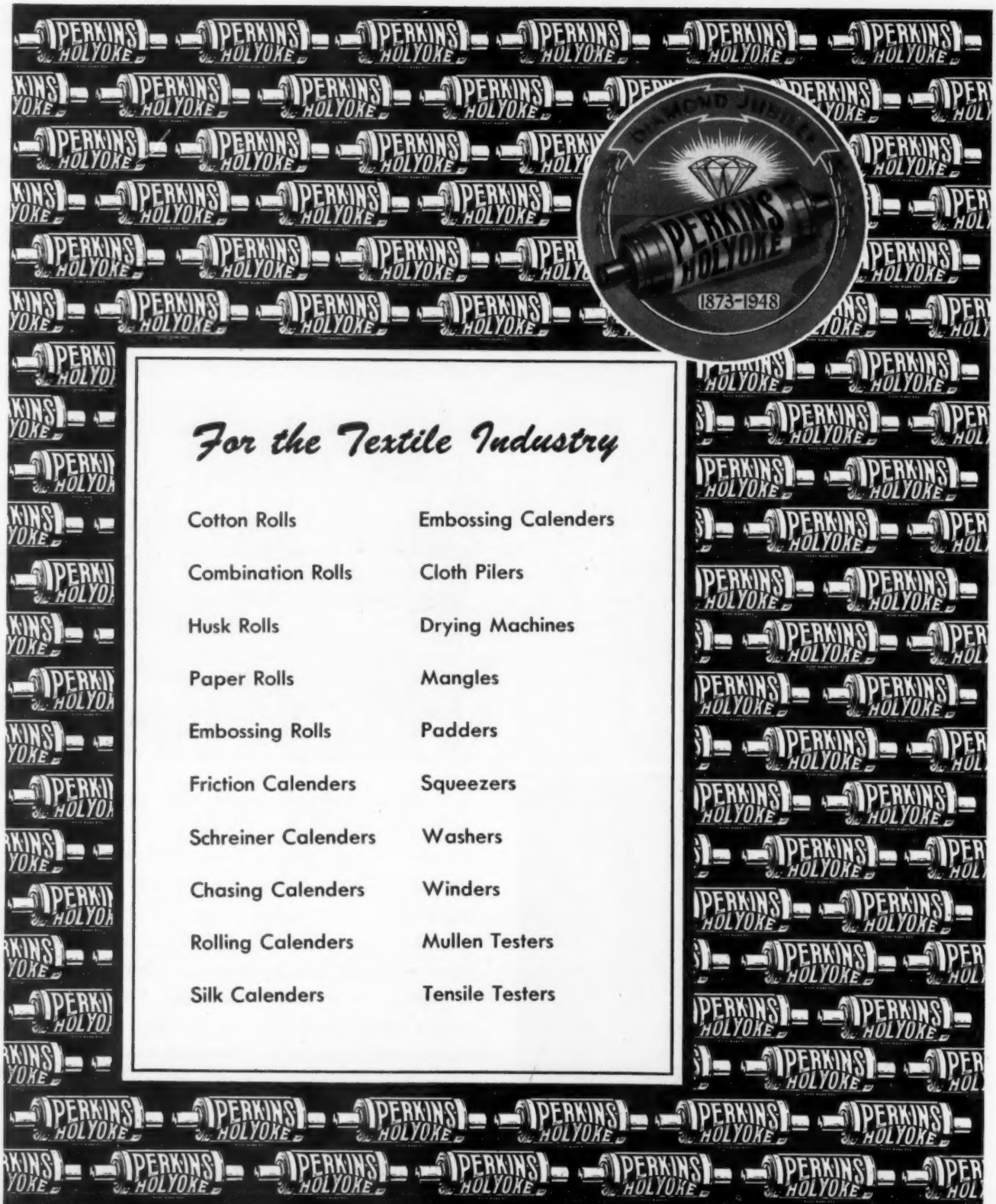
It is a simple easy task for one man with the Tramrail equipment to convey a beam and set it in position on a twisting machine. Where required two or more beams can be mounted on a twister frame with equal ease. Tramrail equipment eliminates the need of floor trucks entirely and thereby removes a chief source of floor damage.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
2865 EAST 287th ST. WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT



For the Textile Industry

Cotton Rolls	Embossing Calenders
Combination Rolls	Cloth Pilers
Husk Rolls	Drying Machines
Paper Rolls	Mangles
Embossing Rolls	Padders
Friction Calenders	Squeezers
Schreiner Calenders	Washers
Chasing Calenders	Winders
Rolling Calenders	Mullen Testers
Silk Calenders	Tensile Testers

B. F. PERKINS & SON, Inc.

ENGINEERS AND MANUFACTURERS

HOLYOKE, MASS.

LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD

ANOTHER of the industry's GREAT MILLS . . .

that will operate with the benefit of the modern

ROSS AIR SYSTEMS

designed by the leading specialists in Air Processing

Reproduced from TEXTILE AGE, November 1947.

ROSS SYSTEMS in the Springs Cotton Mills' new Finishing Plant will effectively confine and remove vapors from processing equipment, prevent condensation on ceiling, walls, etc., eliminate fog, remove evaporation from damp cloth, trenches, etc., and provide comfort cooling for equipment operators.

Like all ROSS Systems, equipment is designed to meet properly the individual plant needs.

At their new $15,000,000 finishing plant at Lancaster, S. C., the Springs Cotton Mills will operate one of the most modern and best equipped plants in the industry.

To insure the utmost in ideal operating conditions, the equipment will include the most advanced types of ROSS Exhaust Hoods, ROSS Ceiling Heating and Ventilating Systems, ROSS General Ventilating Systems and ROSS Comfort Cooling Systems. In addition to the main plant ventilation, ROSS equipment will ventilate Singe, Tank, Starch, Generator, and other rooms.

Another notable example of the important part being played by the dependable ROSS Air Systems in new projects and modernization programs throughout the textile industry.

ROSS SYSTEMS

J. O. ROSS ENGINEERING CORPORATION

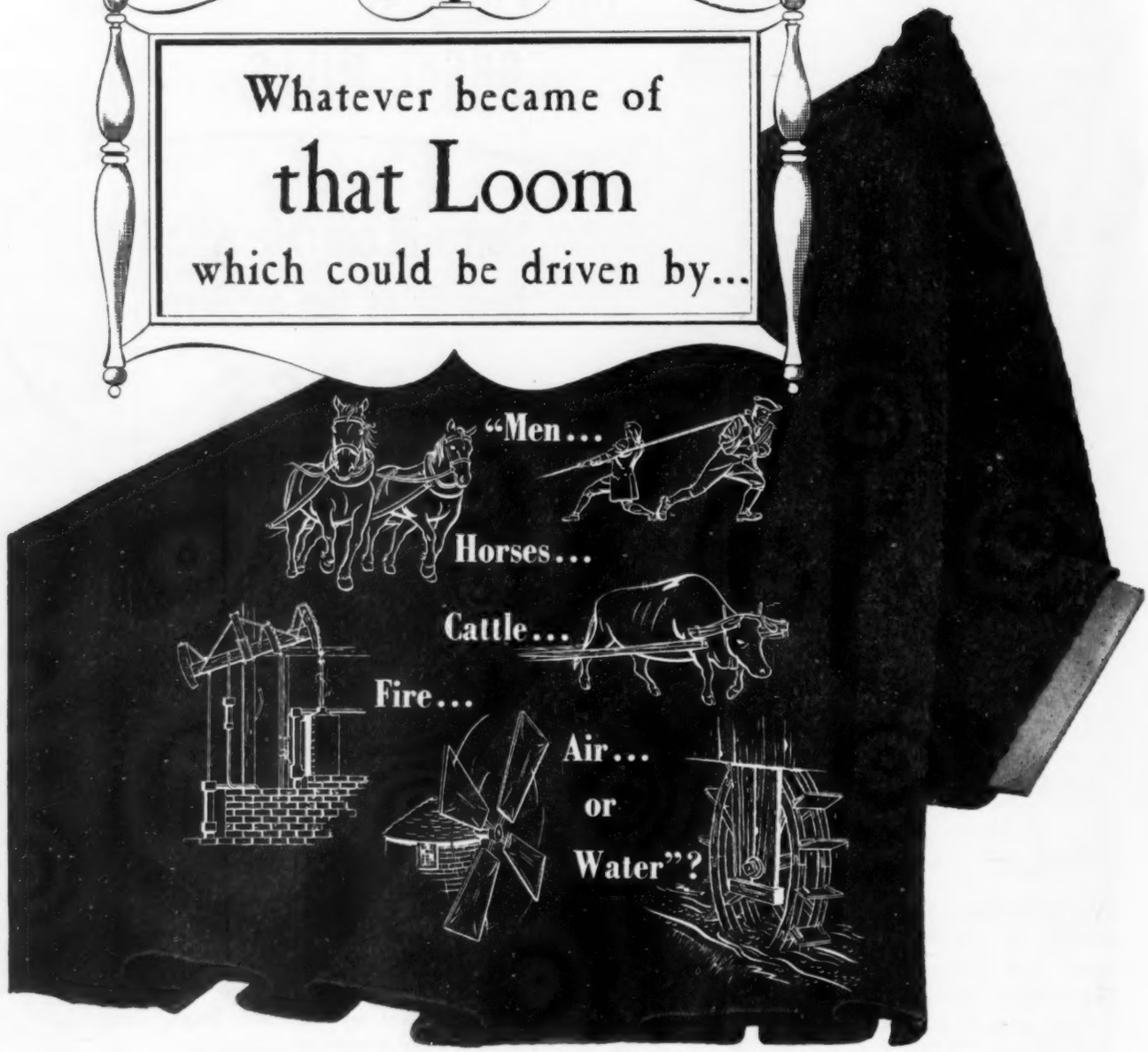
MANUFACTURERS OF AIR PROCESSING SYSTEMS

350 MADISON AVENUE NEW YORK 17, N. Y.

201 N. Wells Street, CHICAGO-6 • 79 Milk Street, BOSTON-9 • 9225 Grand River Avenue, DETROIT-4 • 1231 E. Seventh Street, LOS ANGELES-21

ROSS ENGINEERING OF CANADA, LIMITED, MONTREAL 19, CANADA • CARRIER-ROSS ENGINEERING COMPANY, LIMITED, LONDON, ENGLAND

Whatever became of that Loom which could be driven by...



In 1774 two hopeful inventors, Robert and Thomas Barber, patented a loom for which they made the interesting claim outlined above. Unfortunately no records were kept on the performance of that remarkable machine.

Long before that time, and right down to the present day, the basic process of weaving warp and filling into cloth has excited inventive minds. It will always continue to do so — just as it does C&K engineers, who take each loom-improvement they achieve as merely a step toward the next advance.

They know how long it has been since the lightning of accidental discovery has struck in the loom industry. And they know that the only sure progress is made possible by the steady light that shines out of past experience, onto a planned program of development for the future. C&K Loom-Development moves ahead constantly under that light, guided by a practical awareness of the inter-relationship of *all* loom parts, *all* types of yarns and blends.

In the past 20 years C&K engineers have increased loom speeds . . . reduced loom stops . . . increased the production of rolls of cloth, and cut their cost . . . to the point where, for example, *one of the most generally used C&K Looms is now delivering 61% more output per man-hour, and weaving far better fabrics.* Such progress augurs well for the future . . . particularly for the *financial* future of *your* mill.

Crompton & Knowles Loom Works

WORCESTER 1, MASSACHUSETTS, U. S. A.

PHILADELPHIA, PA. • CHARLOTTE, N. C. • ALLENTOWN, PA.

C&K

CROMPTON & KNOWLES JACQUARD & SUPPLY CO., PAWTUCKET, R. I.

RAPIDASE
for de-sizing

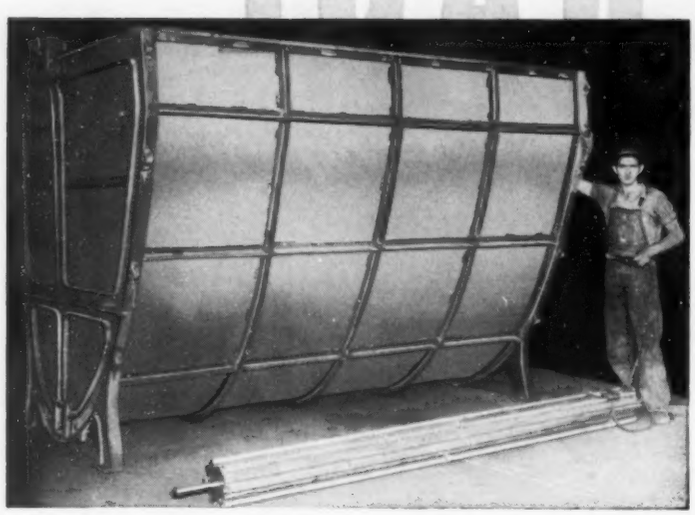
The dependable, rapid and economical de-sizing agent for cottons, rayons and mixed goods. Applicable over a wide range of processes, temperatures and speeds.

HAS PROVED PARTICULARLY SUITABLE FOR CONTINUOUS DE-SIZING

WALLERSTEIN COMPANY, INC. • 180 MADISON AVENUE • NEW YORK 16, N. Y.

Sims is your source for

STAINLESS STEEL INDUSTRIAL SPECIALTIES



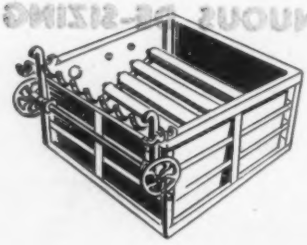
Wash Boxes, Dye Vats and other Finishing Mill Equipment

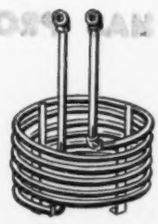
Note Wash Box to the left with vertical and horizontal corners all rounded to eliminate "dead spots" and for easy cleaning. No trace of dyes or liquors previously used is left to contaminate and discolor the succeeding mix. Plain or fluted rolls can be furnished, and other parts such as reels, steam coils, fittings, etc., can be furnished of Stainless Steel for permanency and reduced maintenance costs.

Call SIMS from the start . . . that is the stage where if sufficient engineering experience is utilized, maximum economies can be obtained.

FABRICATORS **Sims METAL WORKS** SINCE 1928

WEST POINT GEORGIA





AMANTHRENE* VAT COLORS
provide the answer to the demand for
better color fastness in textiles

Amanthrene

BROWN RRD

in paste or
double powder form

Advantages of this Vat Brown include a full, chocolate shade, printing excellence and all round good fastness as applied to cotton and rayon . . . Primarily a printing color but easily adapted to the dyeing of these fibres.

A homogeneous paste or a finely divided, dispersible powder offer further advantages.

Another of the Amanthrene range of superior vat colors. For detailed information on the whole range available, as well as data regarding your own particular requirements, consult our nearest branch. A.A.P. technicians are always happy to be of service.

AMERICAN ANILINE PRODUCTS, INC., 50 Union Square, New York, N. Y. • ***Plant:*** Lock Haven, Pa.
Branches: Boston, Mass. • Providence, R. I. • Philadelphia, Pa. • Charlotte, N. C. • Chicago, Ill. • Los Angeles, Cal.
Chattanooga, Tenn. • **Dominion Anilines & Chemicals Ltd.** • Toronto, Canada • Montreal, Canada

*Reg. U. S. Pat. Off.

THIS LABEL...

Schollerized
WASHABLE WOOL
SAFE TO TUB • SAFE TO RUB

MEANS—

WASHABLE Wool

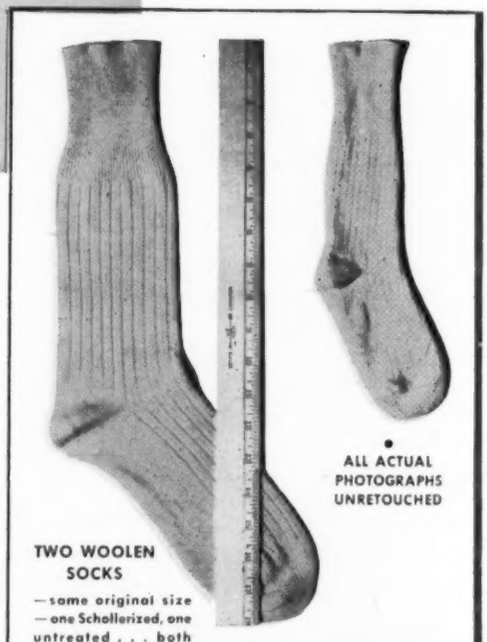
THE SCHOLLER WOOL-SHRINKAGE CONTROL PROCESS*

removes the primary causative factor of wool shrinkage . . . matting and felting. Wool products bearing the "Schollerized" label retain their inherent resiliency, elasticity, "hand" or feel . . . stay to knitted or woven size for the life of the fabric.

THE SCHOLLER WOOL-SHRINKAGE CONTROL PROCESS*

is extremely flexible in its application. Wool may be readily Schollerized in the raw stock, tops, skeins, packages or fabric.

Patent pending



• ALL ACTUAL PHOTOGRAPHS UNRETOUCHED

TWO WOOLEN SOCKS

—same original size
—one Schollerized, one untreated . . . both received 30 washings. Same time . . . same temperature . . . same bath water . . . same agitation. Results? 40% shrinkage on untreated sock . . . intense matting. And the Schollerized sock? Identical to its original size . . . *no matting.*

SCHOLLER BROTHERS, INC.

Manufacturers of Scouring, Dyeing and Finishing Materials

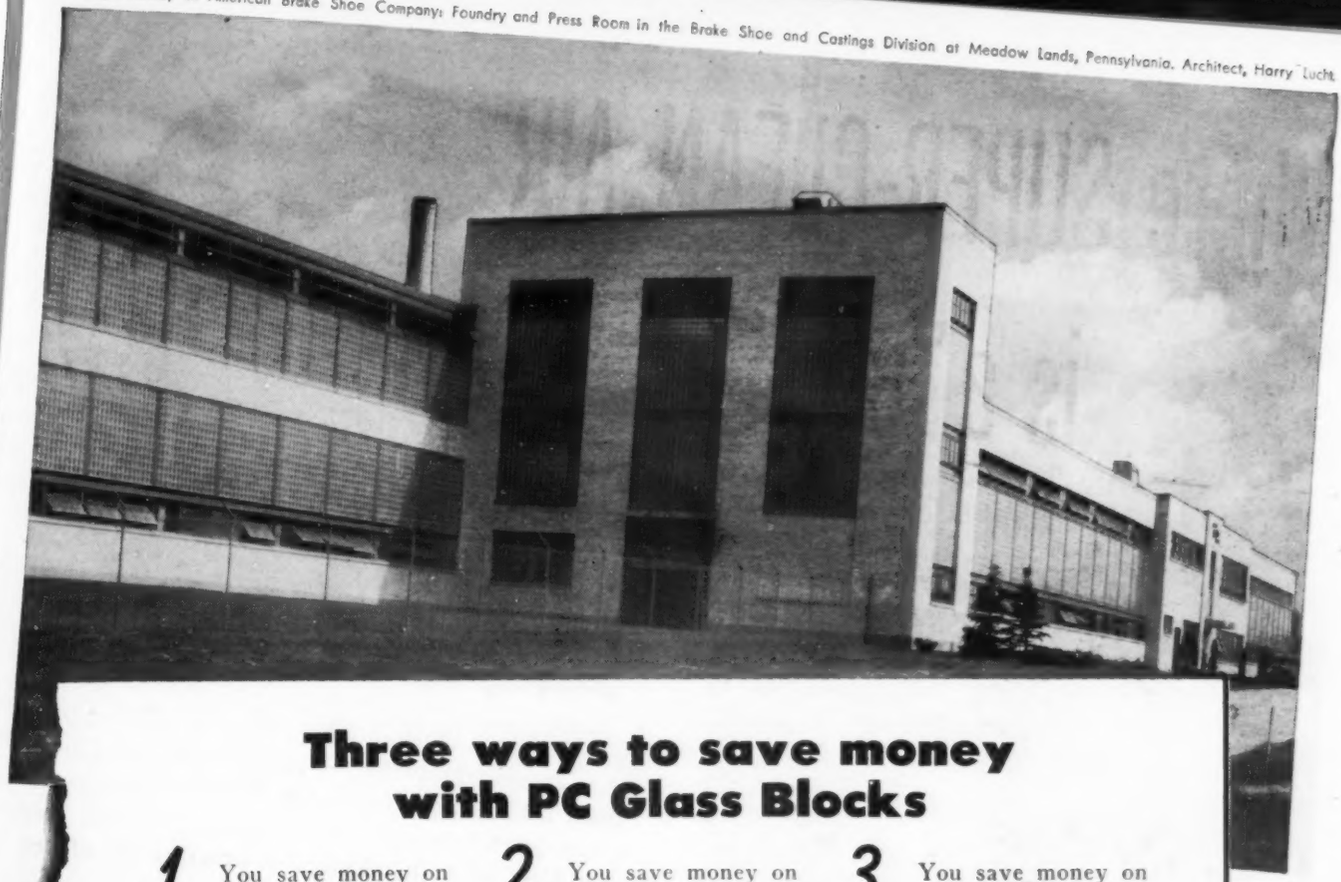
COLLINS at WESTMORELAND, PHILADELPHIA 34, PA.

IN CANADA: SCHOLLER BROTHERS, LTD., ST. CATHARINES, ONTARIO

SERVING THE TEXTILE INDUSTRY FOR MORE THAN 40 YEARS

• The fascinating story on the Scholler wool-shrinkage control process—and its adaptability to your product—is yours for the asking. Write today

Photo, courtesy of American Brake Shoe Company: Foundry and Press Room in the Brake Shoe and Castings Division at Meadow Lands, Pennsylvania. Architect, Harry Lucht



Three ways to save money with PC Glass Blocks

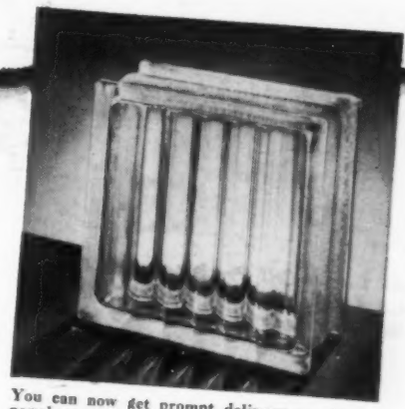
1. You save money on *window maintenance.* No expensive washing of small window panes, one by one . . . for panels of PC Glass Blocks can be cleaned quickly and easily, as a unit. Further, there are no frames or sash to need repairs, repainting or replacement.

2. You save money on *heating and air conditioning.* The excellent insulating properties of PC Glass Blocks reduce heat losses in winter and admit less heat in summer. They lighten the load on heating and air-conditioning equipment, cut fuel costs.

3. You save money on *artificial lighting.* PC Glass Blocks admit plenty of clear daylight—softly diffused to prevent excess brightness — distribute it over wide areas, and can, if desired, actually direct the light to remote areas where it is needed most.

These are three of the important reasons why you should use PC Glass Blocks in all new buildings and remodeling work. It will pay you to know where and why you can use each of the functional patterns to the best advantage. The whole story is told in our new literature. Send the coupon today for your free copy of our new booklet. Pittsburgh Corning Corporation also makes PC Foamglas Insulation.

PC GLASS BLOCKS . . . the mark of a modern building



You can now get prompt delivery on all the popular patterns and sizes of PC Glass Blocks. New construction — and reconstruction — can proceed on schedule. You don't have to wait for hard-to-get metal.

PITTSBURGH PC CORNING ® GLASS BLOCKS

Distributed by PITTSBURGH PLATE GLASS COMPANY
by W. P. Fuller & Co. on the Pacific Coast and by Hobbs Glass Ltd. in Canada

FOR ADDITIONAL INFORMATION SEE OUR INSERTS IN SWEET'S CATALOGS.

Pittsburgh Corning Corporation
Room 677-8, 632 Duquesne Way
Pittsburgh 22, Pa.

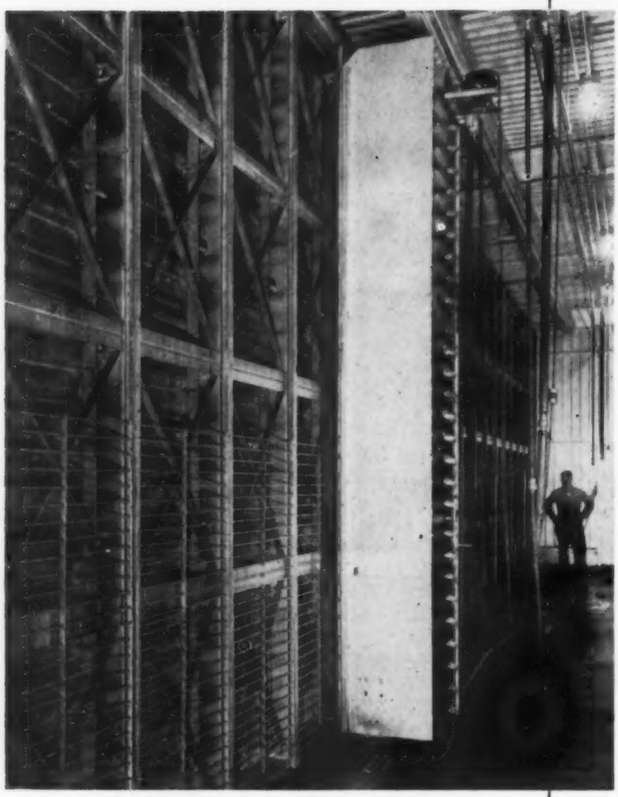
Please send along my FREE copy of your booklet on the use of PC Glass Blocks in Industrial Buildings. It is understood that I incur no obligation.

Name_____

Address_____

City_____ State_____

Where SUPER-CLEAN AIR is a "must"



An Electro-Cell Precipitator of 216,000 CFM capacity with AAF automatic washers now in its third year of service.

AAF Electro-Cell combines high cleaning efficiency with ease of maintenance

WHERE dirt-laden air is a threat to efficient production and quality output, AAF Electro-Cell is a "must". The reason is simple. There's more profitable production where there's super-clean air. The Electro-Cell with its electronic precipitator cleans even the dust and smoke with particles of fractional micron size.

Removable collector plate cells permit selection of maintenance method best suited to your operation. Cells may be manually washed and re-oiled in place; removed for easy cleaning in a special tank, or washed, dried and recoated automatically (as illustrated) with minimum interruption to operation.

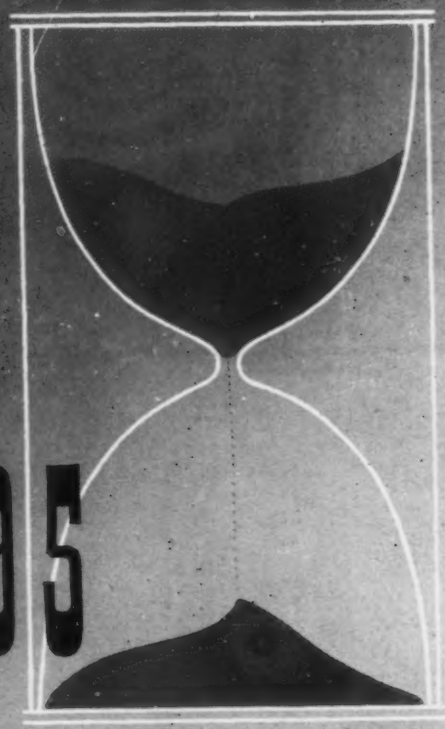
Electro-Cell's sectional construction reduces weight of parts, eliminates multiplicity of electrical connections, protects wiring from dirt and water. And its full-height hinged or removable ionizers minimize electrical losses, reduce ozone and simplify replacement of ionizing wires.

If you want super-clean air plus proven savings in operation and maintenance, get complete Electro-Cell data now. Just contact your local AAF representative or write direct for Bulletin No. 252.

AMERICAN AIR FILTER CO., INC.
275 Central Avenue, Louisville 8, Ky.
In Canada: Darling Bros., Ltd., Montreal, P. Q.

AAF
AIR FILTERS
AND DUST CONTROL EQUIPMENT

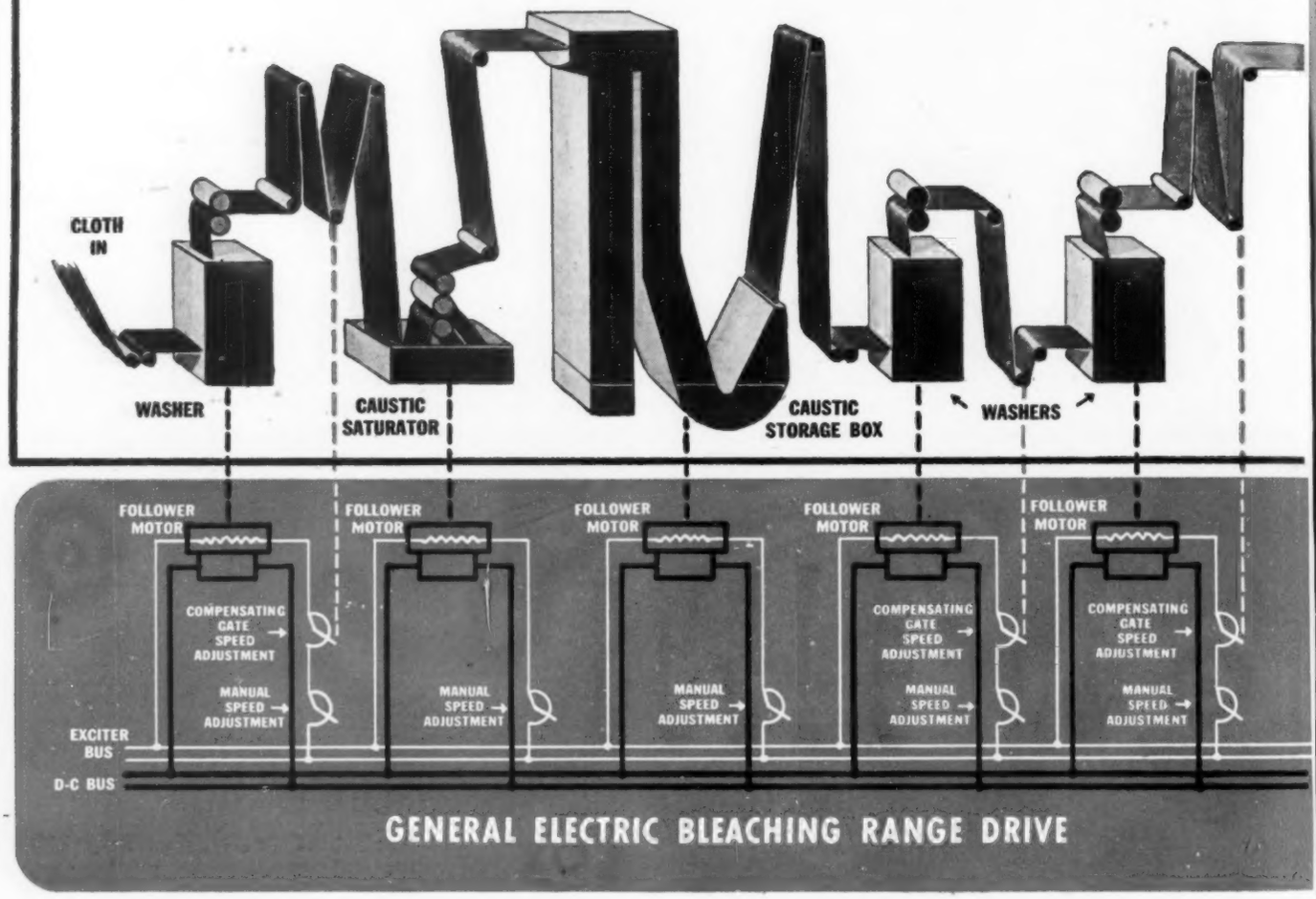
since 1895



. . . we have gained a fundamental knowledge of dyers'
problems and practical dye application, enabling us to set-the-pace
in the invention of *NEW DYES*
TO MEET SPECIFIC DYEING PROBLEMS.
Send us your problems . . .
benefit from this experience.

ALTHOUSE
Chemical Company, Inc.
READING · PA.

BLEACHING SPEEDS



When mills switch from the kier method of bleaching to an electrified continuous range, bleaching speeds can be boosted as high as 275 ypm — quality control is simplified — finishing costs come down!

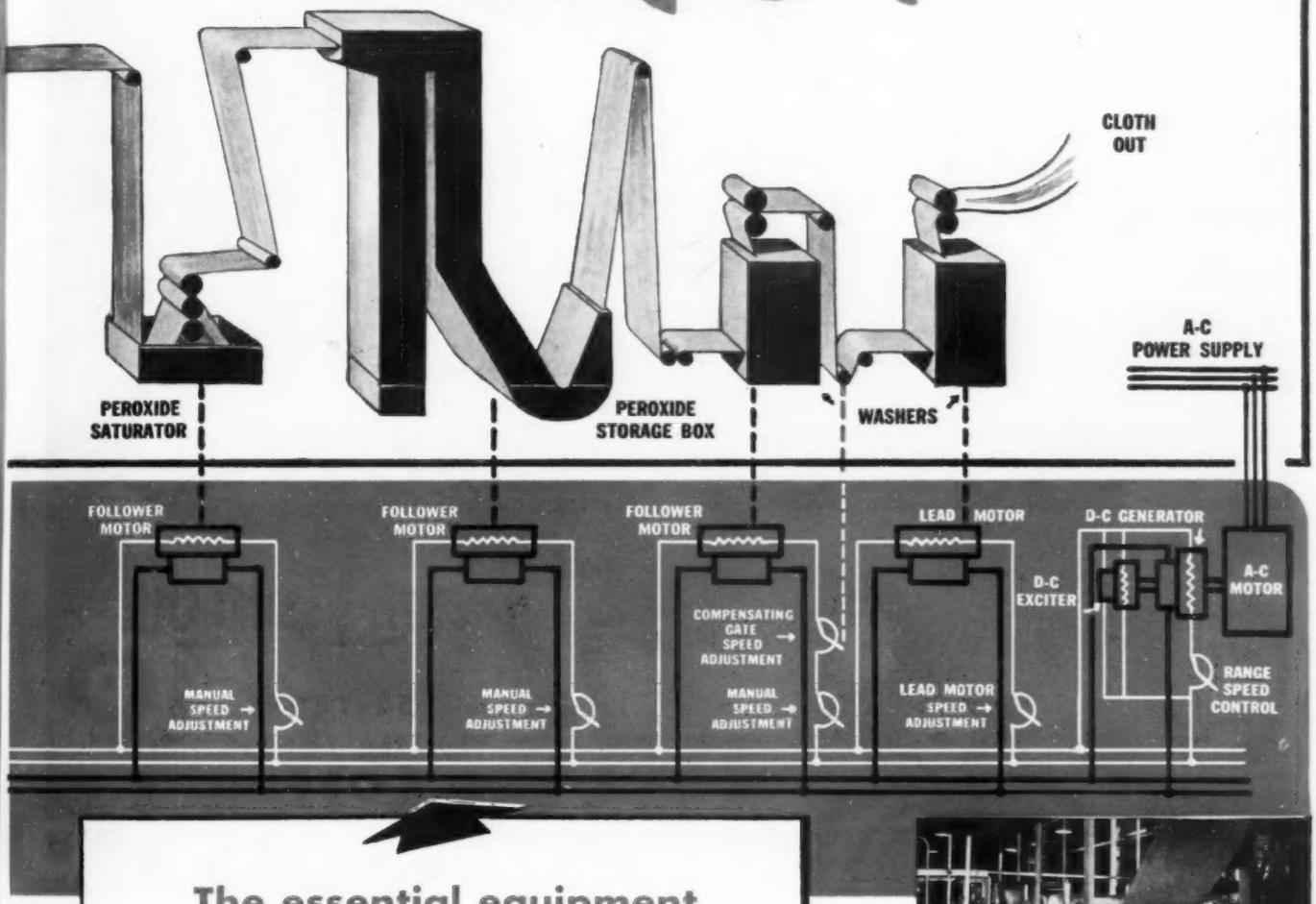
About 15 years ago, it became evident that the kier or batch method of bleaching could not be speeded up enough to meet the demands of modern high-speed textile finishing. The cost of handling cloth in batches was too high. Quality standards were difficult to maintain and serious limitations were placed on a bleaching department's capacity.

The answer was found in today's electrically-driven, high-speed continuous bleaching ranges. By handling cloth in one continuous length, "in-between" losses have been eliminated completely. Quality is high since each length of cloth receives identical treatment. Individual units in the range can be operated at maximum capacity; thus bleaching-department output is higher and finishing costs less.

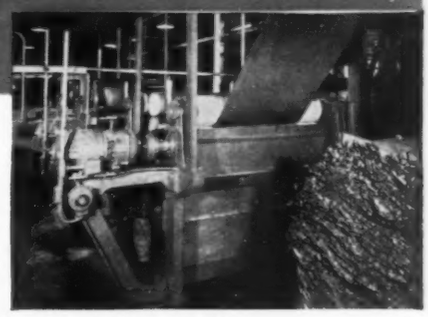
For most range applications a G-E adjustable-voltage d-c drive as shown in the above diagram is most satisfactory. For applications where special conditions prevail, G.E. can supply other types of drives such as constant-voltage d-c, adjustable-speed a-c, and turbine-electric d-c.

Simple yet inexpensive, control of fabric tension or speed is accomplished with compensating gates, soft motors, or other co-ordinating devices such as photoelectric loops, speed regulators and current (tension) regulators. For full data on these drives, write for Bulletin GEA-5010. *Apparatus Dept., General Electric Company, Schenectady 5, New York.*

UP TO 275 YPM!



The essential equipment
. . . AND WHAT IT DOES



G-E electric drives permit compact arrangement of textile finishing range equipment.

The diagram above shows symbolically a G-E adjustable-voltage d-c range drive with a compensating gate co-ordinating system. A single motor-generator set energizes a common d-c circuit which supplies armature voltage to all the range motors. The voltage of this circuit (and thus the speeds of the connected motors) is adjusted by a common generator-field rheostat. Excitation for the generator and the range motors is supplied from a common constant-voltage exciter. Close tension or speed control between units (where needed) is obtained through shunt-field control of the individual motors by the compensating gate rheostats.

DRIVE SYSTEMS FOR TEXTILE MILLS

GENERAL ELECTRIC

661-28

Congratulations to a trade publication that has reported the news of the Textile Industry ably and well for 50 years.

Two years ago NON-FLUID OIL celebrated its 50th Anniversary of lubrication service to industry. During these years the "drip-less" principle of NON-FLUID OIL has been a vital factor in the golden age of mass production which has raised our standard of living far above the rest of the world. We are proud of the record NON-FLUID OIL has compiled during this era of tremendous technological advancement.

The "drip-less" qualities of NON-FLUID OIL have always been particularly useful in the Textile Industry—increasing production of perfect goods and keeping down maintenance costs. As new and improved methods of textile manufacturing develop, so, too, will time-tested and mill-tested grades of NON-FLUID OIL be introduced to maintain our slogan "Better Lubrication at Less Cost Per Month."

NEW YORK & NEW JERSEY LUBRICANT CO.

292 MADISON AVENUE NEW YORK 17, N. Y.

Southern District Manager:
FALLS L. THOMASON, Charlotte, N. C.

WORKS: Newark, N. J.

WAREHOUSES: Charlotte, N. C.—Greenville, S. C.—Atlanta, Ga.—Providence, R. I.—Detroit, Mich.—Chicago, Ill.—St. Louis, Mo.

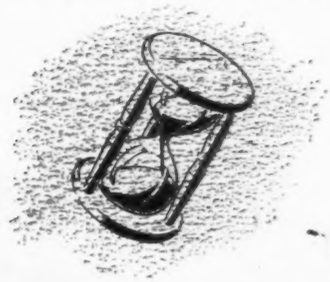
NON-FLUID OIL *is not the name of a general class of lubricants, but is a specific product of our manufacture. So-called fluid grease imitations of NON-FLUID OIL often prove dangerous and costly to use.*

A Timely Message

on TEXTILE INDUSTRIES' 50TH ANNIVERSARY

and OUR 40TH YEAR

serving the FINISHER and DYER



Things you never saw before

This advertisement is addressed to finishers and dyers who have never used Diastafor brand de-sizing agent—Type L. It is written for the man with an open mind, regardless of old loves and loyalties.

Just as a long-range telescope brings before your eyes things you never saw before, Diastafor—Type L can bring to your finishing and dyeing operations ease of use and flexibility you never dreamed of in a de-sizing agent.

This all-purpose de-sizing agent has been developed especially to enable you to work in a wide temperature range. It will work well in a wide pH range. Whether you are working with cottons, rayons or mixed goods, it will give you a smooth, flawless performance. When you use Diastafor—Type L your finishing problems are simple. Diastafor helps prevent uneven dyeing. Never any impairment of tensile strength.

Bleachers and dyers who have used Diastafor—Type L know it really is the fool-proof de-sizing agent. They have made Diastafor the leader for 40 years because they know they can depend on it for easy, economical performance throughout their de-sizing operations.

If you think we seem over-enthusiastic, you should look over our mail and see what users say about it. We shall be glad to send you further information about Diastafor upon request. Our sales and technical staffs are always at your service to give you assistance on any specific problem. Write STANDARD BRANDS INCORPORATED, *Diastafor Department*, 595 Madison Avenue, New York 22, New York.

Hearty congratulations to TEXTILE INDUSTRIES on your 50th Anniversary.

Your record of progress in the last half-century is one of which you may well be proud.

Our records show that 40 years ago Diastafor was advertised in your publication. As early as 1908 the first Diastafor plant was established at Cincinnati, Ohio.

Since then, Diastafor brand de-sizing agents have been constantly improved and modified, through a continuous research program, to meet the changing needs of the textile industry.

Reproduced in the opposite column is a current advertising message to the men who are responsible for finishing operations. On this, your 50th and our 40th Anniversary, we are happy to remind bleachers and dyers of our many years of service to this industry.

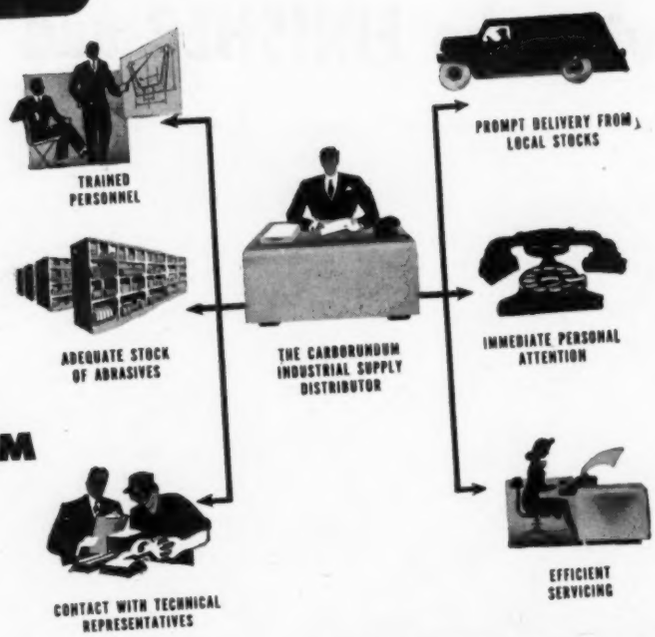
Now, as in the past, our research and technical staffs are eager to be of assistance to you. Write Standard Brands Incorporated, *Diastafor Department*, 595 Madison Avenue, New York 22, New York.

DIASTAFOR

A TRADE MARK OF STANDARD BRANDS INCORPORATED

A BUYING GUIDE FOR ABRASIVES

ABRASIVE PROBLEM:
Where is there a convenient Source of Supply?



ANSWER BY
CARBORUNDUM
TRADE MARK

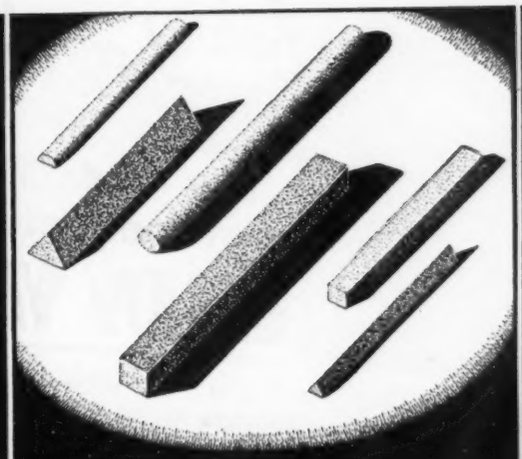
As an efficient and dependable source of supply, the services and facilities of your CARBORUNDUM distributor offer time and money saving advantages.

From large and varied stocks of abrasives located conveniently nearby, the products you need are available without delay. Plant inventories can be safely and economically reduced. Frequent personal service by a trained and experienced local staff provides reliable facts and figures on abrasive applications and operations. On difficult or unusual jobs, direct assistance from CARBORUNDUM representatives is available.

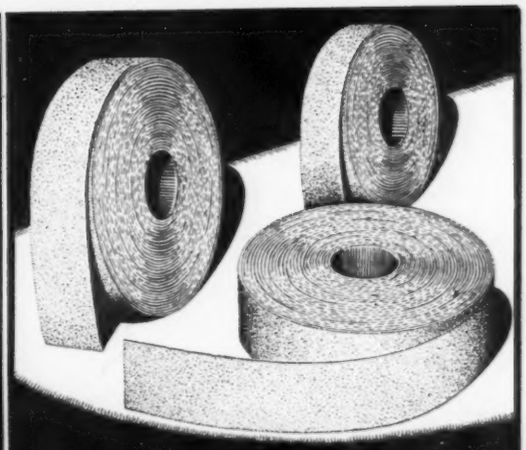
Simplified buying and other important savings realized from intelligent and efficient handling are creating an increasing preference for abrasives by CARBORUNDUM. The Carborundum Company, Niagara Falls, New York.

"CARBORUNDUM" IS A REGISTERED TRADEMARK WHICH INDICATES MANUFACTURE BY THE CARBORUNDUM COMPANY

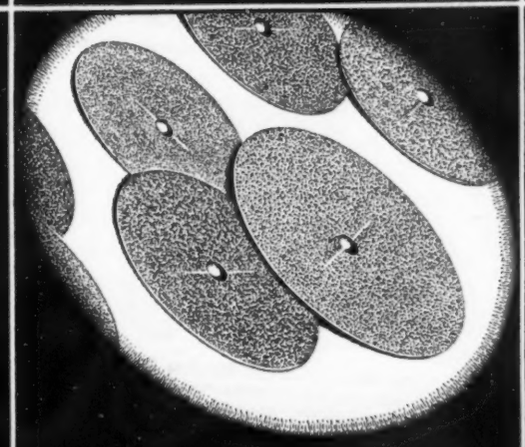
A Good Rule for Good Grinding



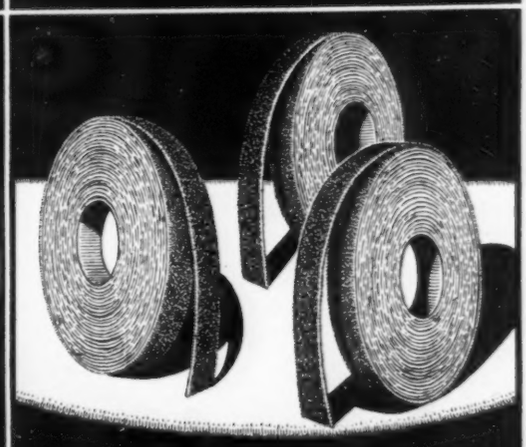
Tool Room sticks and stones that cut fast ... last long ... and hold their form.



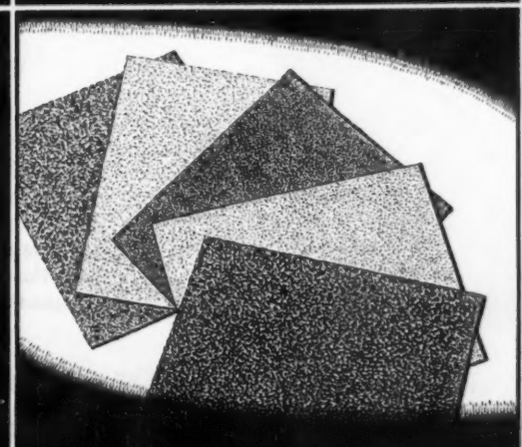
Texalox roll covering grips fabrics firmly, surely but gently.



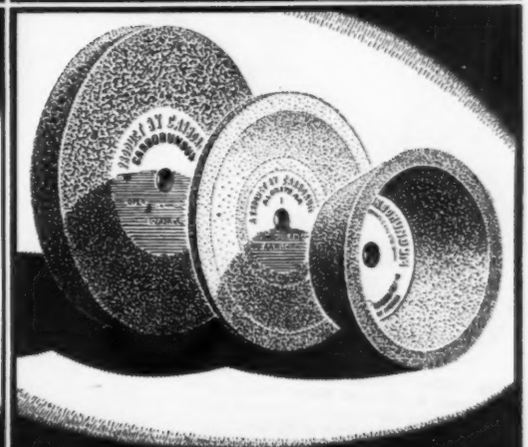
Long lasting Discs for both flat and curved surfaces.



A fillet cloth that assures sharp economical grinding of card clothing.



Sheets of Coated Abrasives for a variety of applications.



All standard shapes are supplied in grinding wheels by CARBORUNDUM.

... CALL IN **CARBORUNDUM**

TRADE MARK

● BONDED ABRASIVES ● COATED ABRASIVES ● ABRASIVE GRAINS AND COMPOUNDS

In Stock... for immediate delivery

The largest and most complete line of ALLOY VALVES

Globe, Gate, Check and "Y" Valves and Liquid Level Gauges made in Stainless Alloys, Nickel, Inconel, Monel Metal and Aluminum—the result of a quarter of a century of pioneering in the field of Special Designs and Special Alloys for Corrosion Resistance.

Also a complete line of Bronze, Iron, and Cast Steel Valves in stock for immediate delivery.

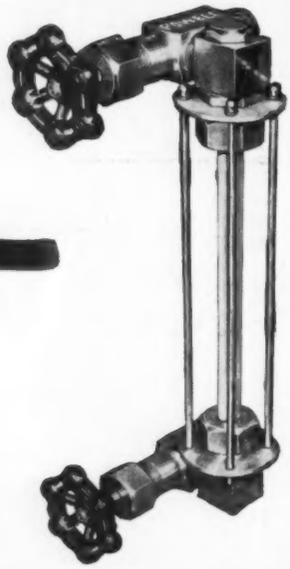


Fig. 1886—Liquid Level Gauge, with screwed ends, for 350 pounds W. W. P. Powell offset pattern. Made in stainless Steel—Type 304 or 316.

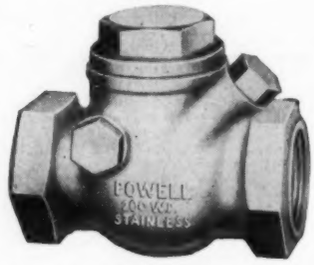


Fig. 1847—200-pound Stainless Steel Swing Check Valve with screwed-in cap and regrindable, renewable disc.

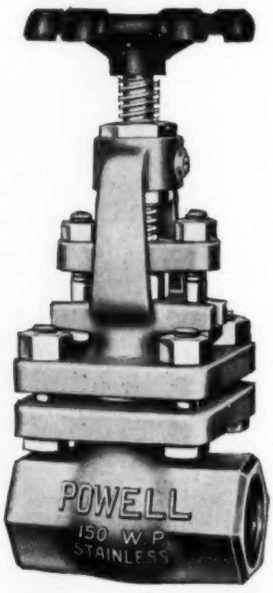


Fig. 1978—150-pound Stainless Steel Globe Valve with screwed ends, outside screw rising stem and bolted flanged yoke-bonnet.

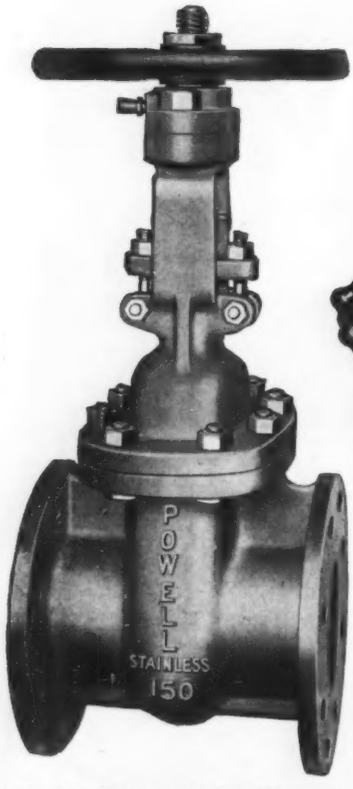


Fig. 2453-G—New, standard 150-pound Stainless Steel Gate Valve with outside screw rising stem, bolted flanged yoke-bonnet and tapered solid wedge.

Fig. 2051—150-pound Stainless Steel "Y" Valve. Has flanged ends, bolted flanged yoke, outside screw rising stem and plug type disc.

If you do not have a copy of the Powell Alloy Valve Catalog No. 242—"Powell Valves for Corrosion Resistance"—write for one.

The Wm. Powell Company
Cincinnati 22, Ohio
DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

Rayon Reports

Prepared Monthly by American Viscose Corporation, New York, N. Y. June 194

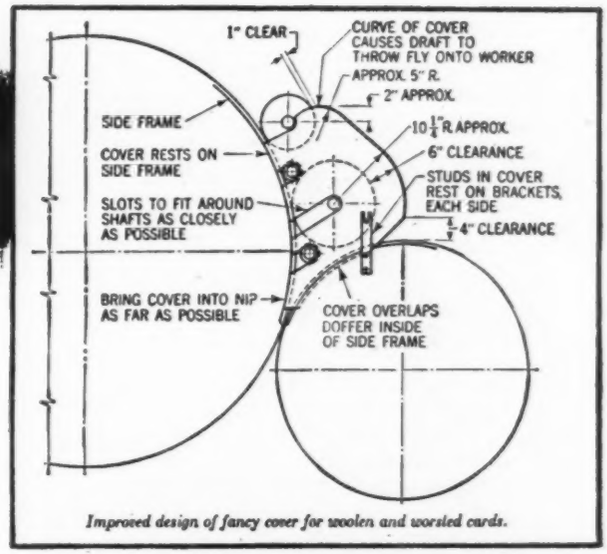
New Book on Rayon Technology Gives Latest Information For All Divisions of the Textile Industry

"Rayon Technology," an advanced handbook for textile mills, prepared by the Textile Research Department of American Viscose, has just been published by McGraw-Hill Book Company, New York.

Mill men, teachers, students and others who want the latest technical information on processing rayon into yarn, grey goods and finished fabrics will find this book a mine of up-to-date data on spinning rayon staple on the cotton, woolen and worsted systems; rayon fabric construction, throwing, weaving, knitting, dyeing and finishing.

Each of these essential topics is discussed by an American Viscose specialist and is described in detail with supplementary pictures and charts so that it can be read separately by those seeking specialized information. Yet because rayon cuts across all divisions of the industry, the book read as a whole gives an excellent over-all picture of textile manufacture. Copies of this handsomely bound 276 page textbook can be obtained through standard sources for technical books or by writing McGraw-Hill Book Company. The price is $3.75.

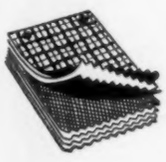
Drawing of improved design of fancy cover for woolen and worsted cards—typical of the data presented in "Rayon Technology."

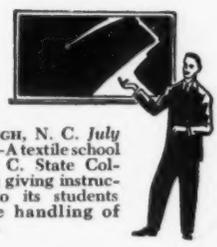

1" CLEAR
CURVE OF COVER CAUSES DRAFT TO THROW FLY ONTO WORKER
APPROX. 5" R.
2" APPROX.
SIDE FRAME
10 1/4" R APPROX.
6" CLEARANCE
COVER RESTS ON SIDE FRAME
STUDS IN COVER REST ON BRACKETS, EACH SIDE
SLOTS TO FIT AROUND SHAFTS AS CLOSELY AS POSSIBLE
1/4" CLEARANCE
BRING COVER INTO NIP AS FAR AS POSSIBLE
COVER OVERLAPS DOFFER INSIDE OF SIDE FRAME

Improved design of fancy cover for woolen and worsted cards.

RAYON 20 YEARS AGO

New York, *July 1928*—A group of standard colors for rayon knit underwear fabrics has been established by Rayon Fabrics Institute.





Raleigh, N. C. *July 1928*—A textile school of N. C. State College is giving instruction to its students in the handling of rayon.

Italy, *July 1928*—Increased exports of rayon reported, 98% of this being viscose.

MAKE USE OF *Avisco*® 4-PLY SERVICE

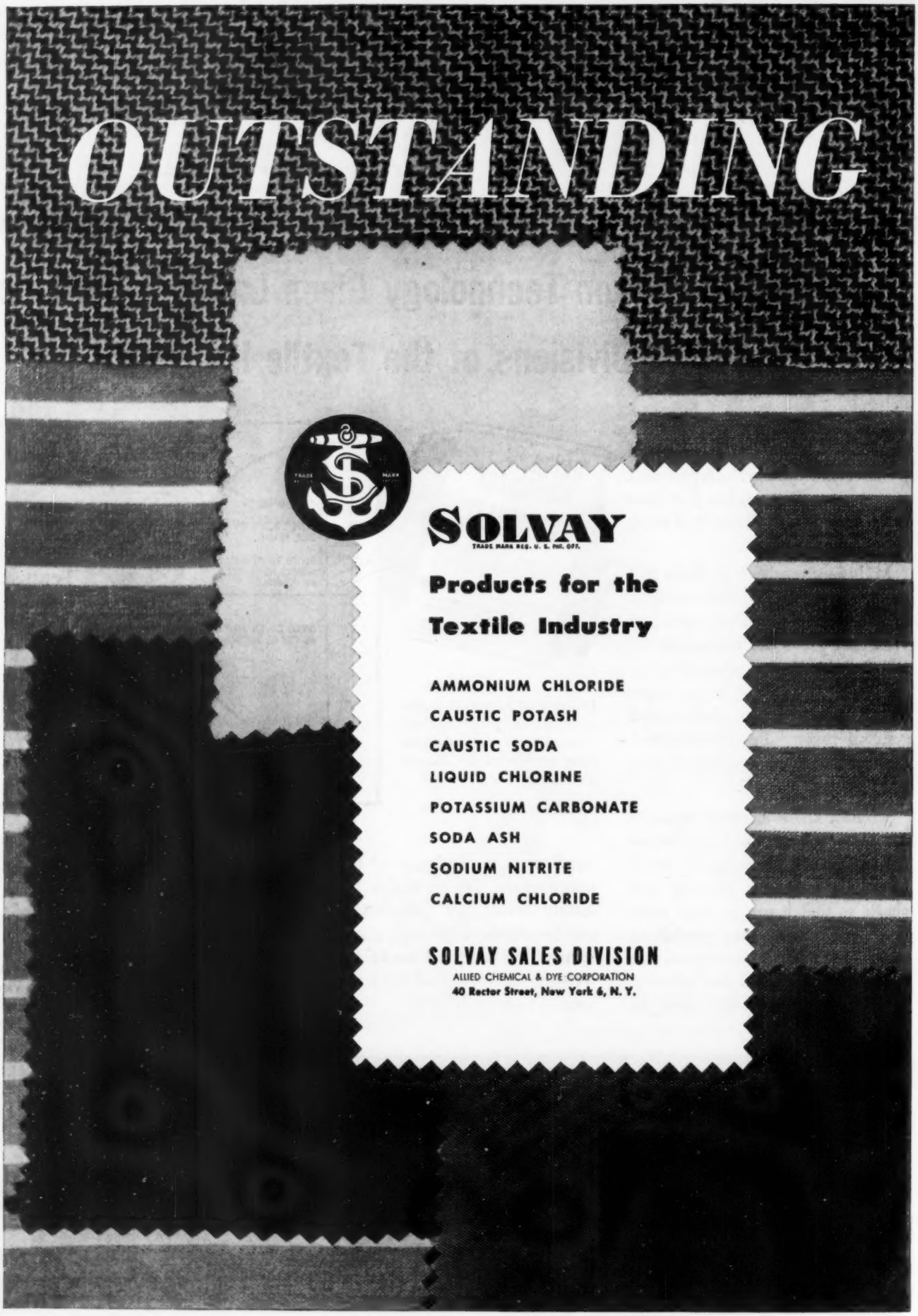
To encourage continued improvement in rayon fabrics, American Viscose Corporation conducts research and offers technical service in these fields:

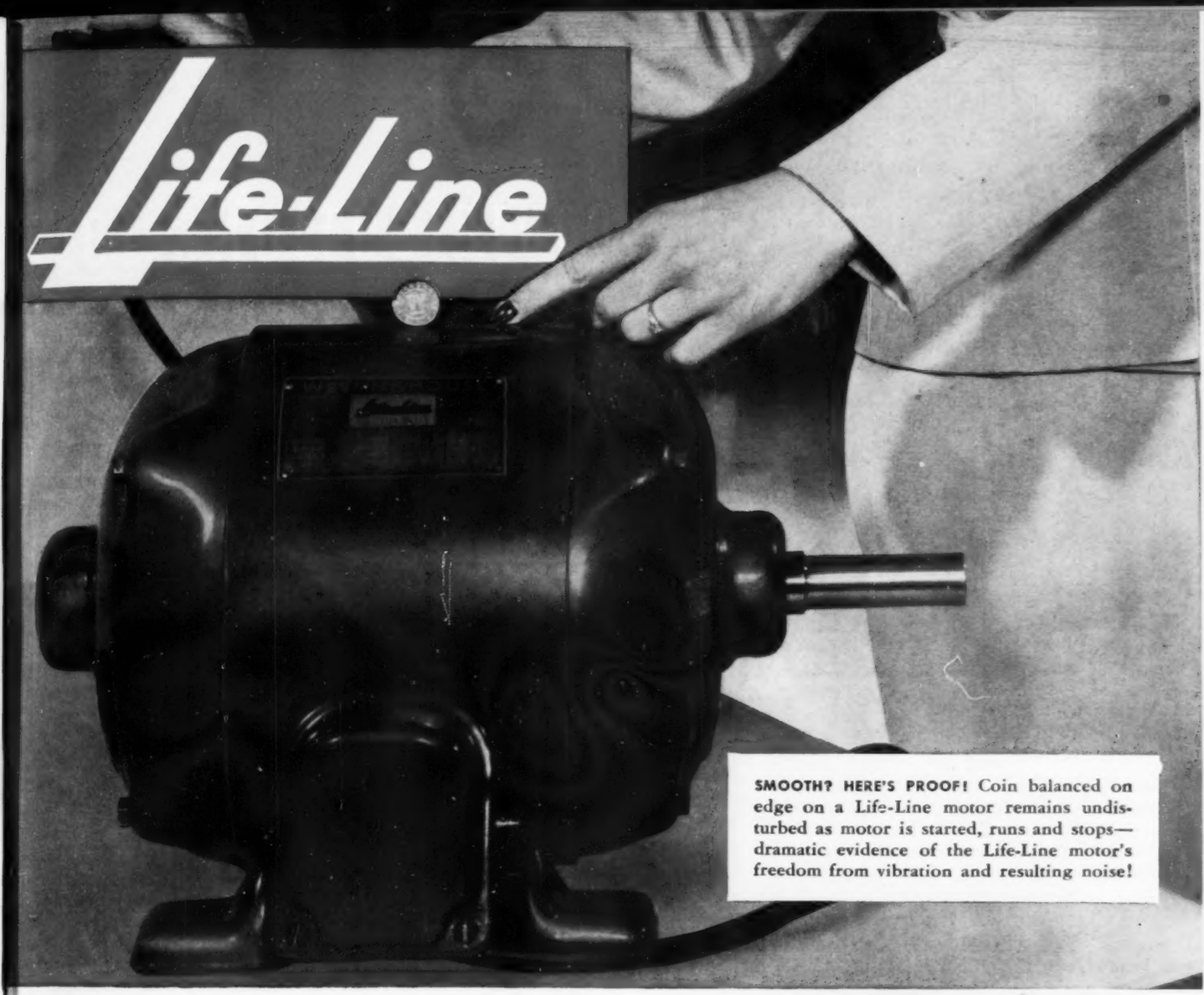
1 FIBER RESEARCH
2 FABRIC DESIGN
3 FABRIC PRODUCTION
4 FABRIC FINISHING

AMERICAN VISCOSE CORPORATION

America's largest producer of rayon

Sales Offices: 350 Fifth Avenue, New York 1, N. Y.; Charlotte, N. C.; Cleveland, Ohio; Philadelphia, Pa.; Providence, R. I.


OUTSTANDING
SOLVAY
TRADE MARK REG. U. S. PAT. OFF.
Products for the
Textile Industry
AMMONIUM CHLORIDE
CAUSTIC POTASH
CAUSTIC SODA
LIQUID CHLORINE
POTASSIUM CARBONATE
SODA ASH
SODIUM NITRITE
CALCIUM CHLORIDE
SOLVAY SALES DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.



SMOOTH? HERE'S PROOF! Coin balanced on edge on a Life-Line motor remains undisturbed as motor is started, runs and stops—dramatic evidence of the Life-Line motor's freedom from vibration and resulting noise!

NEW METHODS BRING "SPECIAL-MOTOR" SMOOTHNESS TO STANDARD MOTORS

Motors have been made in much the same way for many years—up to the time Westinghouse—with years of leadership in a-c motor developments—departed from "tradition" in electric motor concepts and built the Life-Line.

Motor-making traditions were broken by the basketful. Motor users were surveyed to find what they wanted in standard motors that they were not getting. Life-Line motors were designed and built from scratch—by new methods and new tools in a totally new plant—to include these features.

Quieter operation was one feature motor users asked. Life-Line motors provide it. Ventilating design limits "windage" noise. New manufacturing techniques insure absolute alignment and accuracy of fit, reducing vibration. Modern tests check every motor for accuracy in manufacture.

You'll want full details on other Life-Line features, too. Life-Line motors, now built in sizes from 1-15 hp, are available in standard and near-standard types from stock. Other sizes and types—up to 200 hp—soon will be changed over to modern Life-Line design.

Check your nearest Westinghouse office for deliveries—or write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

J-21457-A

MOTOR "ASTHMA" CHECK. Sounds that shouldn't be there don't get by this "noise detective". Audiometer determines wave length of noise; sound level meter (left) determines decibel rating of the noise; sound analyzer (at right) then indicates the relative amount of the different frequencies resulting.

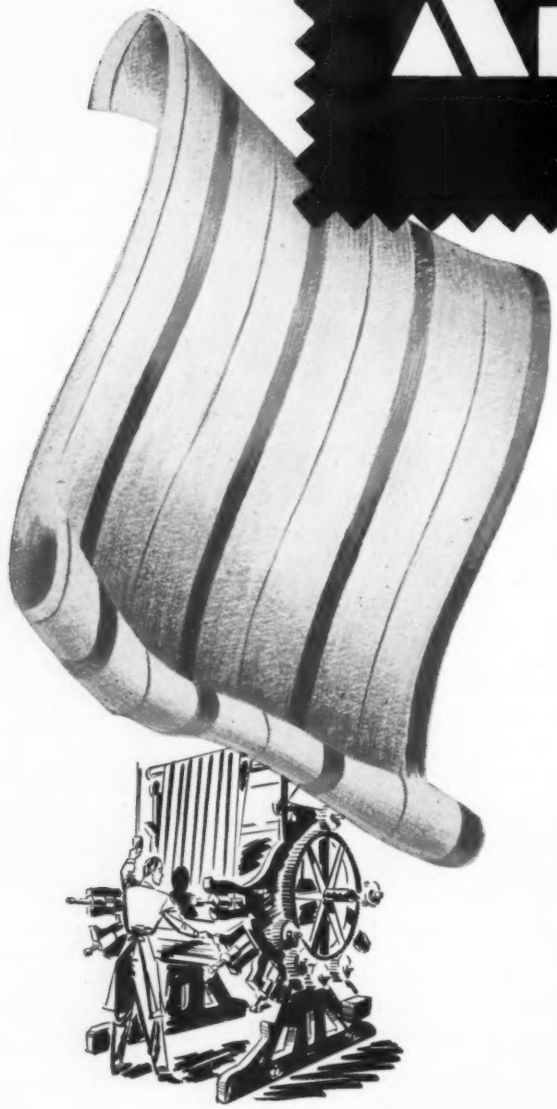
Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

Life-Line motors

CONTRIBUTIONS TO THE PROGRESS OF TEXTILE COLORING

Aridye *Pigment Colors*



The development of *Aridye® Pigment Colors* has proved to be one of the most important advances in the art of textile printing within the past half century. Introduction of these colors late in 1937 made it possible for the first time to produce pigment-printed fabrics which will withstand repeated washing or laundering without change of shade.

Aridye Pigment Colors for application by the water-in-oil emulsion system have many advantages over conventional dyes. They provide *sharpness of mark, brilliancy of shade, excellent all-round fastness, ease and economy of operation, no impairment of hand.* Aridye Pigment Colors as printed are *final in shade*—permitting defects to be detected and corrected immediately and eliminating the necessity for ageing and soaping. These are some of the reasons why leading printers are using Aridye Pigment Colors for solving some of their most difficult problems and for everyday jobs as well.

The importance of the pigmented water-in-oil emulsion system is indicated by the fact that during the last 10 years it has been employed for printing over 2,000,000,000 yards of cotton, rayon, and other fabrics.

Other types of Aridye Pigment Colors have been developed for printing and dyeing textiles by the oil-in-water emulsion system, the solvent dispersion system, and the aqueous dispersion system.

Interchem

Dyes

Of the various classes of dyes made by the Textile Colors Division of Interchemical Corporation, *Interchem® Acetate Dyes* for application to acetate rayon and nylon are the best known. Dyers of such fabrics report that with Interchem Acetate Dyes they have *fewer seconds and fewer redyes.*

Because Interchem Acetate Dyes are colloidized during manufacture, they disperse rapidly and thoroughly when pasted with warm water, leaving no undispersed particles. *Therefore the danger of dye specks is virtually eliminated.* They are suitable for dyeing on jigs or boxes. They are useful for producing self shades and compound shades.

Interchem Acetate Dyes promote level dyeing; give more consistent results from dye formulas, thus making possible better color-matching control. They have good pile on and do not tar at high temperatures. Many Interchem Acetate Dyes are suitable for application and/or discharge printing.

In addition to acetate dyes, selected dyes in other classes are produced for specific applications, particularly when fastness is a requirement. One of the latest additions is the custom-built Interchem Formaldehyde Black GDW, a rich, bloomy black which gives perfect white discharges on cotton and viscose rayon.

For complete information on these products which have contributed greatly to the progress of textile coloring, write to: Interchemical Corporation—Textile Colors Division, Box 357, Fair Lawn, New Jersey.

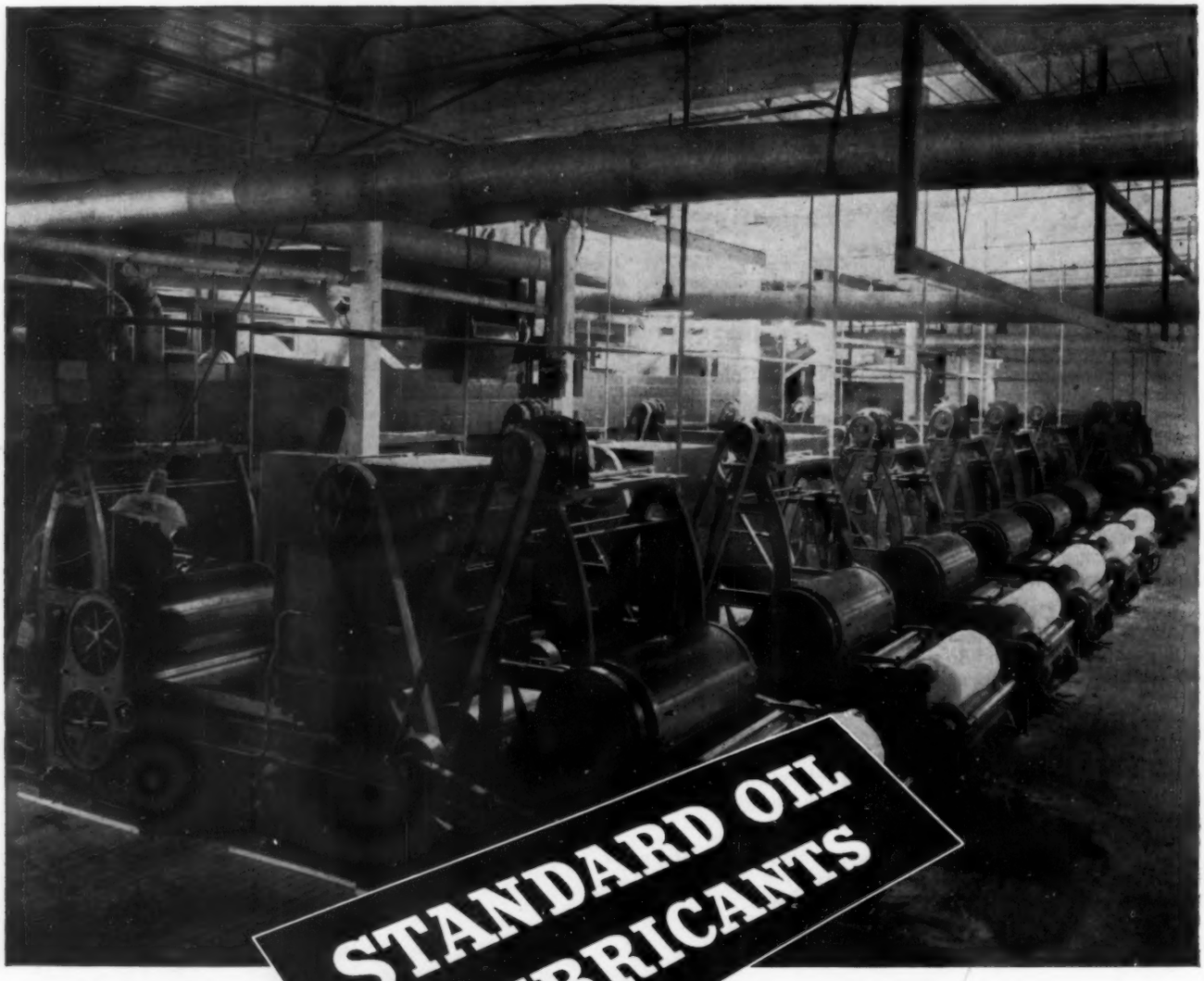
INTERCHEMICAL CORPORATION

TEXTILE COLORS DIVISION, FAIRLAWN, N. J.

ROCKHILL, S. C. • PROVIDENCE, R. I.

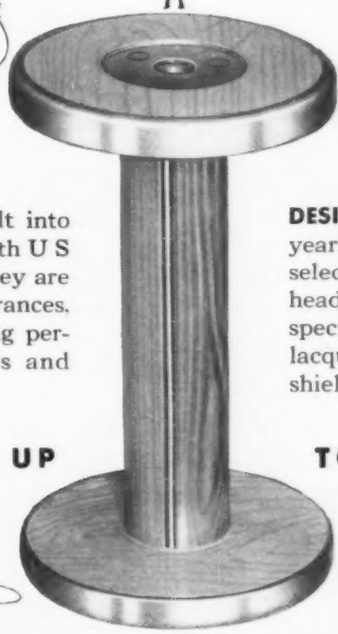
Sixty years ago Standard Oil pioneered the field of specialized lubricants for textile mills. Standard Oil lubricants have been *first* in popularity ever since. An early start, alone, could not assure this consistent lead. Constant improvements through research and careful attention to the changing needs of the industry have kept Standard Oil lubricants the first choice of many mills. It is simply a matter of record, a fact proved by *performance,* that Standard Oil lubricants do the best all-round job of keeping mill machinery at peak efficiency with the least maintenance expense. From breaker room to weaving shed, wherever there's a moving part there's a Standard Oil lubricant made especially for it. And remember—new Standard Oil products are constantly being introduced to serve you still better. Ask your Standard Oil man about them.

blazing the trail



STANDARD OIL COMPANY INCORPORATED IN KENTUCKY

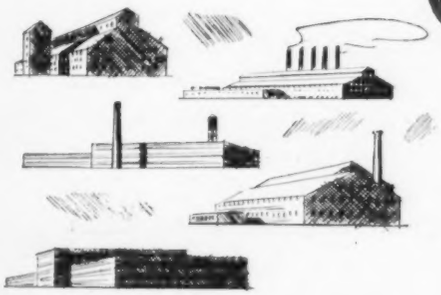
Speed Up Twisting ...SPOOL UP WITH U S



TO GET THE BETTER PRODUCTION built into today's better equipment, start *right*—with U S Spools. Made to protect yarn quality, they are precision-built to the closest possible tolerances, and accurately balanced for true-running performance, reducing wear on bolsters and spindles.

DESIGNED WITH "KNOW-HOW" based on 91 years' experience, U S Spools are made from selected northern stock, with fiber or wood heads, and are supplied in all sizes to meet any specifications. They are finished plain, oiled or lacquered and are fitted with metal bushings or shields when required.

U S SPOOLS MEASURE UP



AMPLE PLANT CAPACITY. Six plants in North and South locations closely keyed to textile production areas, are fully equipped to handle any size orders. U S has cooperated with textile machinery manufacturers for 91 years, and can meet the closest possible limits of tolerances in all tests for dimensions, weight and balance.

TO EVERY TWISTING NEED

CONSULT A U S REPRESENTATIVE regarding your spool requirements. You'll find him a thoroughly practical millman, familiar with all types of textile processes, and able to offer experienced advice on the use of U S products for any purpose. Let him help you in choosing Bobbins, Shuttles, Cones, Rolls, or other U S products.

U S BOBBIN & SHUTTLE CO.

PROVIDENCE, R. I.
GREENVILLE, S. C.
CHICAGO AGENT:
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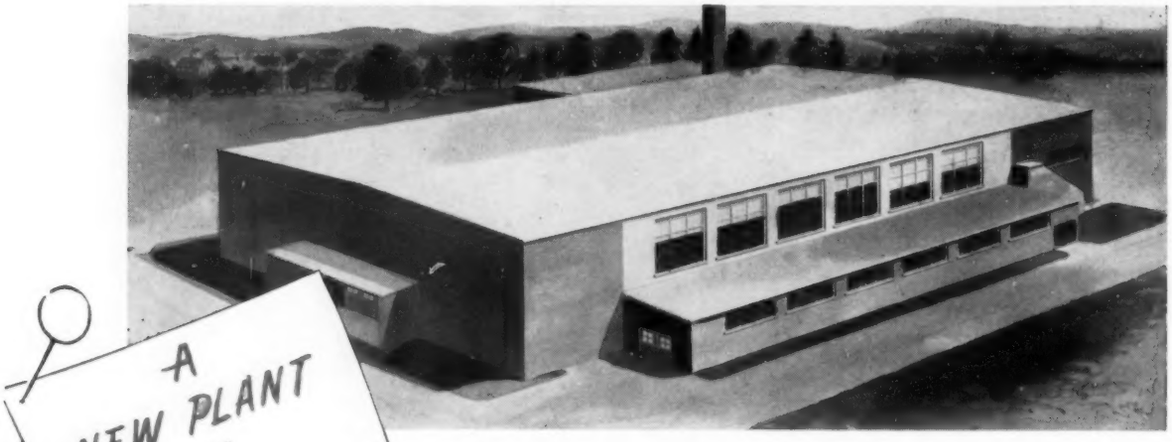
JOHNSON CITY, TENN.
CHARLOTTE, N. C.
ALABAMA AGENT:
Young & Vann Supply Co.
Birmingham

This is also **OUR** *Fiftieth*

And here's how we're celebrating...



A NEW PLANT AT GREENVILLE, S.C.

Like **TEXTILE INDUSTRIES**, we are proud of our fifty years service to the textile industry.

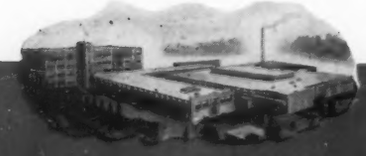
Originally developed for worsted and woolen spinning, **A. P. T.** Yarn Carriers have since been designed and sold in tremendous quantities for the spinning, twisting or weaving of all types of fibres. Therefore, we can also point with pride to **PROGRESS**,—history making in some cases.

But present performance and future intentions are of more interest to mill men than past performance. That is why we call the particular attention of southern mills to our new plant at Greenville, S. C., started in 1947 and reaching full production this year.

The production of this plant is planned to facilitate delivery of those **A. P. T.** Yarn Carriers which are in particular demand in the South, such as our Cotton Warp Spinning Bobbin and our Rayon Weaving Quills. The capacity of this plant will be expanded as conditions require it.

Our Woonsocket plant will continue to serve the textile industry in this country and abroad and will also stand ready to assist our southern plant in meeting peak requirements.

Ask about **A. P. T.** Yarn Carriers for **YOUR** spinning, twisting or weaving operations.



PLANT AT WOONSOCKET

AMERICAN PAPER

WOONSOCKET, R. I.
GREENVILLE, S. C.

CANADIAN
Hugh Williams & Company

ANNIVERSARY

1. For Wrap Stripe Hosiery Machines.
2. For Headless Package Rayon Spinning.
3. For Worsted and Woolen Mule Spinning.
4. For Worsted and Spun Silk Ring Spinning.
5. For Silk and Rayon Weaving — Electric Feeler Motion.
6. For Worsted — French Type or Ring Spinning, and Twisting.
7. For Silk and Rayon Weaving.
8. For Cotton and Rayon Staple Warp Spinning
9. For Automatic Rayon Weaving — Electric Feeler Motion.
10. For Wool Ring Spinning.
11. For Automatic Rayon Weaving — Mechanical Feeler Motion.
12. For Giant Package Wool Mule Spinning.
13. For Box Loom Rayon Weaving — Electric Feeler Motion.
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13

GENERAL ADVANTAGES OF A. P. T. YARN CARRIERS

RESIST DISTORTION • RESIST CHIPPING AND SPLITTING • NEVER SPLINTER • PERFECT BALANCE • PERFECT SPINDLE CLING
FREE BUT CONTROLLED DELIVERY • FREE FROM STATIC • LIGHT WEIGHT • GREAT STRENGTH
LONG LIFE • ULTIMATE LOW COST • RESILIENT

TUBE COMPANY

REPRESENTATIVES
Toronto, Ontario, Canada

Established 1898

TEXTILE BANKING COMPANY

Inc.

Factoring Service

Puts your sales on a cash basis
Strengthens your cash position
Relieves you of credit losses

55 MADISON AVENUE • NEW YORK

NEW HIGH-SPEED BLEACHING BOX FEATURES:

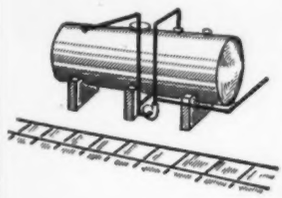
1. Higher bleaching speeds —limited only by washer capacity.

2. Improved piling mechanism—positive pulling draw reels remove cloth faster than previous designs.

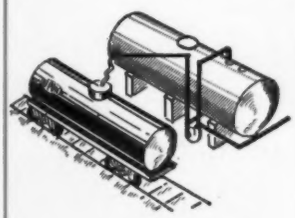
3. Increased capacity—more cloth can be handled without increase in the size of the equipment.

4. Reduction in floor space requirements—overall length of J-Box has been reduced by 25% or more.

FOR GREATEST ECONOMY, CONSIDER:



TANK STORAGE AT THE MILL



TANK CAR DELIVERIES

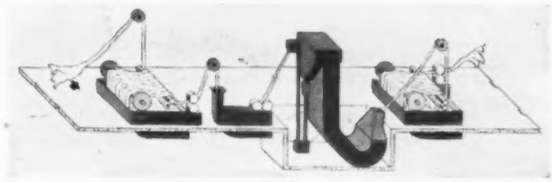
If you need 5000 lbs. or more of "Albone" 35 (35% Hydrogen Peroxide) per month, you'll find a storage tank installation to be economical.

SEND FOR THIS NEW BOOK!

It shows typical continuous bleach layouts designed to fit the requirements of various plants. For a copy just write: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98 Del.

CHOOSE ONE OF THESE 4 DU PONT CONTINUOUS PEROXIDE BLEACHING SYSTEMS

to bleach MORE goods FASTER, at low cost

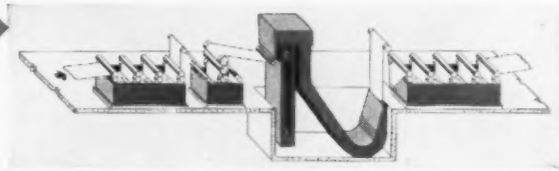


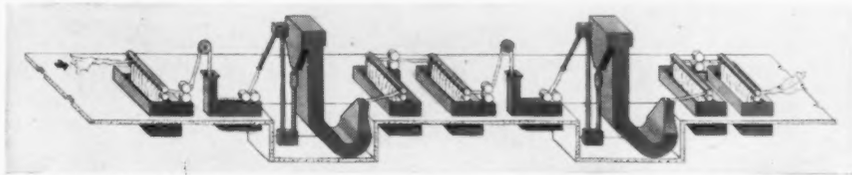
ONE-STAGE ROPE SYSTEM

An ideal arrangement for mills that require weekly production of 200-500 thousand yards of goods averaging 3 yards/pound or lighter.

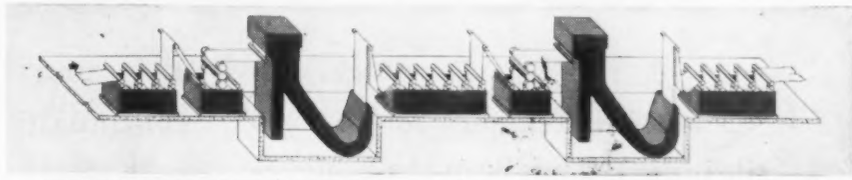
ONE-STAGE OPEN-WIDTH SYSTEM

For production requirements of 150-300 thousands yards/week of goods that cannot be rope-processed—especially successful with a wide range of heavy fabrics.





TWO-STAGE ROPE SYSTEM For processing a wide variety of fabrics; print cloths, sheetings, shirting, shade cloth, etc.: handles 1¼—1½ million yards/week of 4-yards goods.



TWO-STAGE OPEN-WIDTH SYSTEM For cloth that cannot be handled in rope form. Operating speed generally between 75 and 125 yards/minute. Any degree of bleaching obtained by adjusting peroxide strength.

• • •

TO PRODUCE quality bleaching at lower over-all cost, look into these *Du Pont* systems. They're readily adaptable to speedy, uniform processing. In use in many leading mills, Du Pont Continuous Peroxide Bleaching systems are easy to set up, operate and control . . . and they're backed by the years of experience and "know how" of Du Pont Technical Service.

Send for Du Pont's booklet that shows typical continuous bleaching layouts designed to fit the requirements of various plants. For your copy, write:

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department
Wilmington 98, Delaware

DU PONT CONTINUOUS PEROXIDE BLEACHING

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

H&B MODERN

PLANT AT PAWTUCKET, R. I.

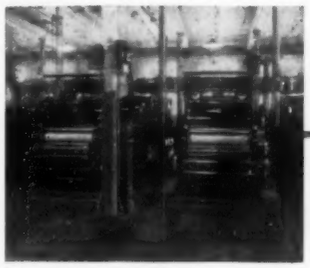
Quality machinery for the textile industry has been the achievement of H & B for more than 50 years. By careful planning from the beginning, in engineering, materials and production, we have continually built machinery for each specific job in each individual mill. Attention to detail, to the LITTLE things, has truly made a BIG difference.

H&B AMERICAN

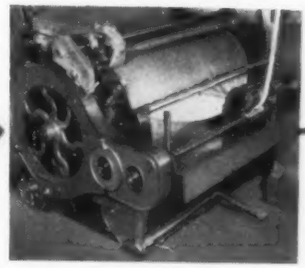
Builders of Modern

FACTORY, EXECUTIVE OFFICES AND EXPORT

TEXTILE MACHINERY

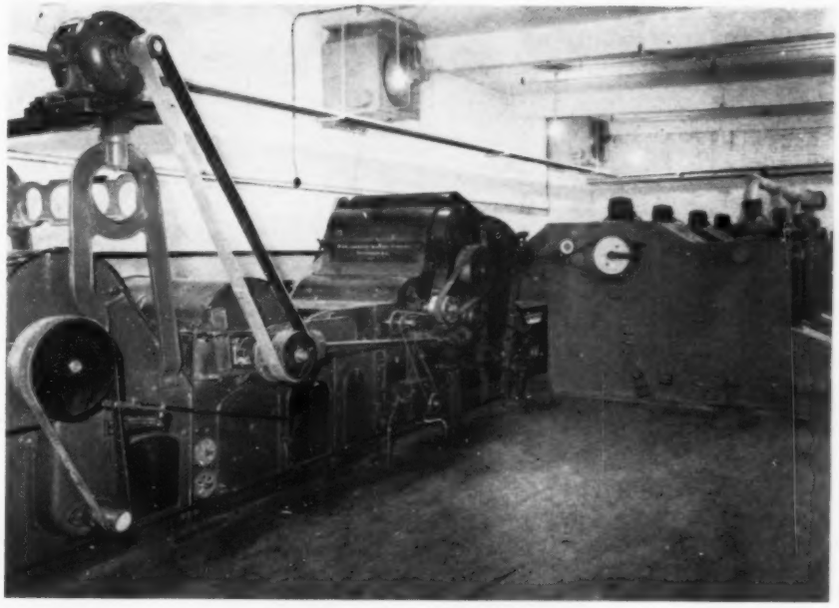


PICKERS



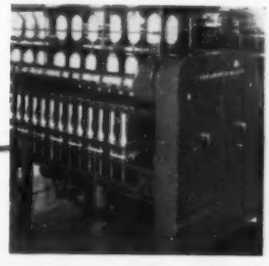
CARDS

DRAWING FRAMES

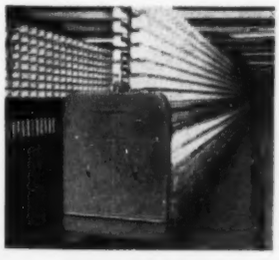


OPENING EQUIPMENT

SPEEDERS



SPINNING FRAMES



TWISTERS

MACHINE CO.

Textile Machinery

DIVISION PAWTUCKET, RHODE ISLAND, U. S. A.

BRANCH OFFICES
ATLANTA, GA.
815 CITIZENS AND SOUTHERN NATIONAL BANK BUILDING
CHARLOTTE, N. C.
1201 JOHNSTON BUILDING

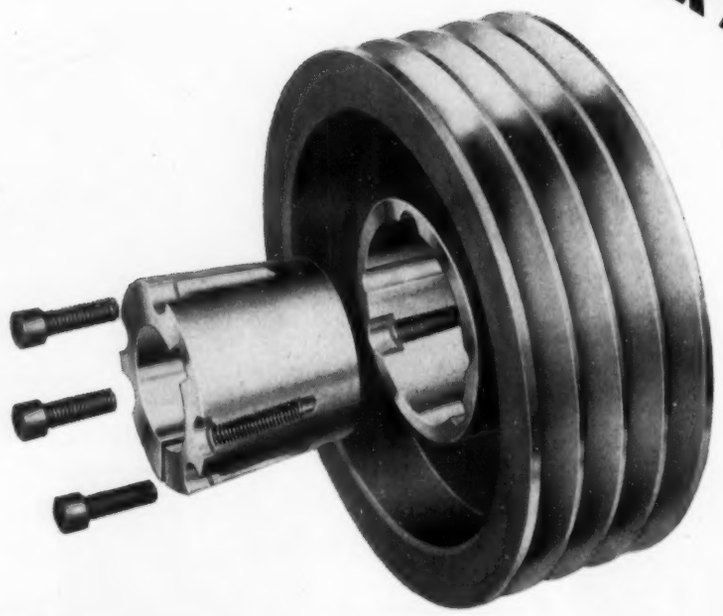
IT'S TAPER-LOCK! IT'S REVOLUTIONARY!

The simplest, surest mechanism ever devised for holding wheels to shafts. Another Dodge "first" —and the biggest development in this field in years!

The TAPER-LOCK Sheave breaks all speed records in mounting. Slip it on, line it up and tighten while sighting! Saves time—saves money.

Easy on, easy off! Disengages with less effort; holds fast to the shaft with firmness equivalent to a shrunk-on fit.

No flange. No collar. No protruding parts. Close mountings are possible. Bushing extends entire length of hub. TAPER-LOCK runs *true*.



A complete unit—in a complete range of sizes in Dual Duty (A and B); B, C, and D grooves. Write us for detailed bulletin, A175C, on this new and different taper bore sheave.

DODGE MANUFACTURING CORPORATION
Mishawaka, Indiana

DODGE

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER

He is your local Dodge Distributor—factory trained—qualified to suggest ways to improve your machine performance, increase production. Look for his name under "Power Transmission Equipment" in your classified phone book.

TAPER-LOCK: Trade Mark Registered U. S. Pat. Off.

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NAME PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, ETCHING COMPANY OF AMERICA, 1520 MONTANA STREET, CHICAGO 14, ILLINOIS

SAVE SOAP—SAVE MONEY

WITH

YARMOR

HERCULES PINE OIL

In wet processing of cotton, wool, silk, or rayon, Hercules Yarmor* enhances the detergent action of soap . . . penetrates deeper . . . wets out thoroughly . . . and rinses clean.

This pure, steam-distilled pine oil is an excellent solvent for waxes and oils . . . an excellent dispersant for dyes.

It will pay you to investigate Yarmor Pine Oils. For technical details, request the services of an experienced Hercules service man, or ask your supplier of textile chemicals. Mail coupon for the book, "Hercules Pine Oils in the Textile Industry."

WETS AND PENETRATES

•

REMOVES DIRT AND GREASE

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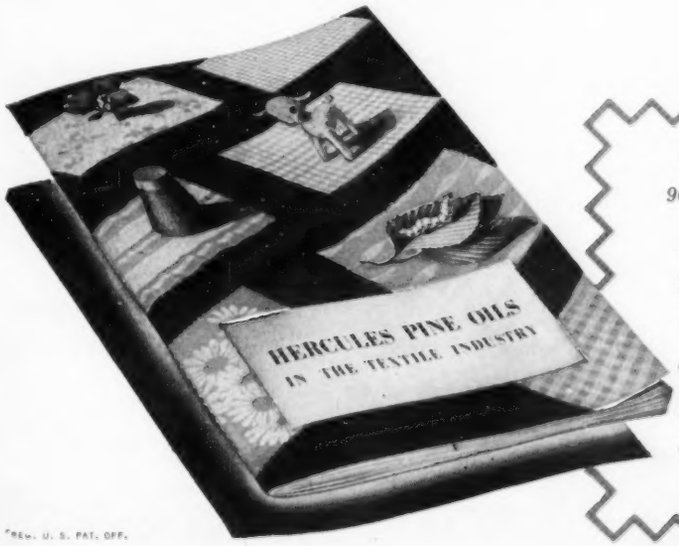
RINSES CLEAN

HERCULES



*REG. U. S. PAT. OFF.

HERCULES POWDER COMPANY
INCORPORATED

903 Market Street, Wilmington 99, Delaware

Send free book, "Hercules Pine Oils in the Textile Industry."

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NYD-6

YOUR GREATEST VALUE IN BEARING BRONZE

■ When you buy Johnson UNIVERSAL Bronze you buy much more than metal. You make a wise investment in bearing performance and economical bearing life. You save considerable money too.

First, you have the widest range of sizes to choose from . . . over 350 solid and cored. Every bar is completely machined, eliminating all extra work and guaranteeing perfection all the way through. Every Johnson UNIVERSAL Bar is entirely usable from end-to-end.

When you cut the bar you are pleasantly sur-

prised to note how easily it handles. Ordinary tools turn the metal with ease and with speed. There is no grit or sand inclusions to contend with.

When the finished bearing is installed, check up on its performance and life. Note how smooth, how quietly it operates. Note also, the exceptionally long bearing life . . . the elimination of frequent replacement.

Why not try a bar on your next job? Your local Johnson Bronze Distributor carries a complete stock for immediate delivery.

Catalogue

It's NEW . . . listing and describing the most complete bearing service in the market . . . and it's FREE.

JOHNSON BRONZE

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The MOST COMPLETE SLEEVE BEARING SERVICE in the WORLD

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ALL PURPOSE-ALL ALUMINUM SECTION BEAM

30" HEAD 12" BARREL

30"

LOW COST!!

DELIVERY 90 DAYS

REMOVABLE HEADS

Both Heads can be removed in a matter of minutes in case of accidental damage allowing low cost on replacement of parts.

HIGH STRENGTH HEADS: ..... to withstand terrific pressures exerted by *all* types of fine denier synthetic yarns when warped to full capacity.

BALANCED: ..... for high speed uniform warping.

POLISHED FINISH: ..... accurately machined and polished for yarn protection and smooth operation at high speeds.

REMOVABLE SHAFTS: specially designed journals.

TESTED AND APPROVED: ..... by several of the largest synthetic yarn manufacturers and *now in use.*

HUBBARD Presents to You the new aluminum *all purpose* beam *of the future*

Designed for present *and future* fine denier synthetic yarns

HUBBARD SPOOL COMPANY
1627 Carroll Avenue
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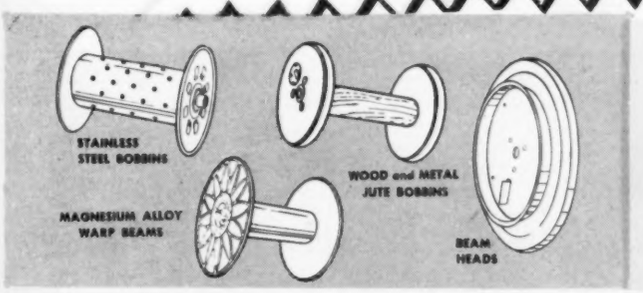

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Since 1912 Manufacturers of Spools and Related Products

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IT'S A STOCK MOTOR
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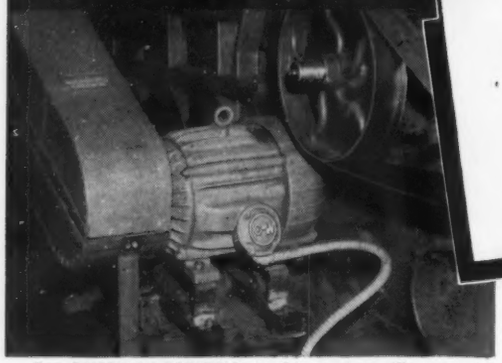
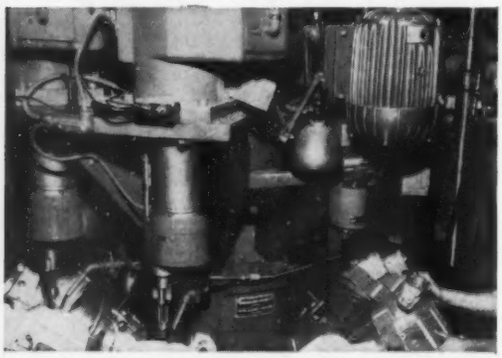


For DUSTY LOCATIONS In this woolen mill, even airborne lint is no problem. It can be cleared from the air grille of the fan cowl, or the cowl vent, with a whisk of a brush while the motor is running.

For CORROSIVE CONDITIONS Used for driving a chemical pump, this SEALEDPOWER motor convincingly demonstrates the high resistance of the sturdy cast iron frame to corrosion.



Under showers of CHIPS and OIL Powering a machine tool, this SEALEDPOWER motor proves its effective seal against chips, splashing oil or coolant, vapors, or dust.

FOR ANY APPLICATION WHERE
EXCESSIVE MAINTENANCE IS INDICATED
—specify SEALEDPOWER and SAVE

You'll Agree THERE'S NO OTHER MOTOR LIKE THE

C-W SEALEDPOWER

TOTALLY-ENCLOSED....FAN-COOLED MOTOR

"Time-out for clean-out" is the bugbear that boosts maintenance of most totally-enclosed, fan-cooled motors. But "time-out" is designed out of the C-W SEALEDPOWER Motor. Because there are no easily-clogged, hard-to-clean internal ventilating passages, you don't have to take it apart to clean it.

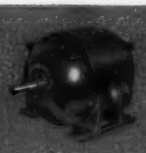
ONLY THE SEALEDPOWER MOTOR has exterior cooling, with the fan driven airstream blowing over the finned frame, carrying dust and fumes *outside* and *away*.

IT'S A PRODUCTION BOOSTER! You can install a SEALEDPOWER and forget it . . . it cleans itself. Even under extremely dirty conditions, the SEALEDPOWER keeps production going many times longer than "ventilating passage" motors without a shut-down for cleaning. Just figure the production time gained.

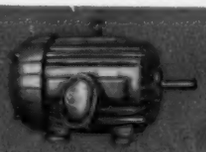
CONTINUOUS COOL-RUNNING EFFICIENCY The exclusive outside fin construction provides over 150% *more* cooling surface. And cool operation is continuous, year after year, because no blanket of dust can pile up to block escaping heat.

BEATS RUST AND CORROSION The frame of the SEALEDPOWER is rugged *cast iron,* for highest resistance to conditions of excessive moisture and corrosion. There is no steel to rust. Vital operating parts are sealed securely in a pocket of clean air.

SEALEDPOWER is now available in new ratings . . . 3 to 40 hp . . . horizontal and vertical with NEMA "C" face, "B" or "D" flange mountings. Talk over your motor needs with a Crocker-Wheeler representative. Or, write for descriptive data on Crocker-Wheeler AC and DC motors and generators, and flexible couplings.



Protected-Type Motors



Sealedpower Motors

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Generators

Flexible Couplings

# of 80% and more!

150% MORE COOLING SURFACE
is provided by the radiating fins, exclusive with the C-W SEALEDPOWER. Here, fluttering streamers trace the fan-driven airstream that blows dust and fumes outside and away.

CROCKER WHEELER

ELECTRIC MANUFACTURING COMPANY, AMPERE 3, N. J.

A Division of The Joshua Hendy Corporation

Branch Offices:
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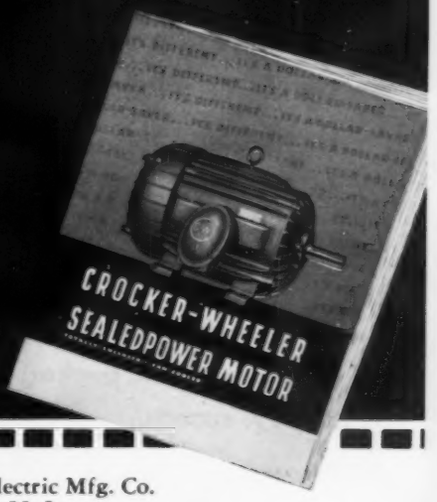
QUALITY MOTORS AND GENERATORS SINCE 1888



Before You Buy ANY totally-enclosed motor, be sure to read why SEALEDPOWER will prove a "maintenance-miser" for you. This new booklet, "It's Different—it's a Dollar-saver," is packed with facts no savings-minded motor user can afford to overlook. Write for it.

Crocker-Wheeler Electric Mfg. Co.
Ampere 3, N. J.

Send the SEALEDPOWER Motor Booklet, *"It's Different—it's a Dollar-Saver"*

T1748

Name .....

Title or Function .....

Company .....

Address .....

HIGH STABILITY For Continuous

Sinclair LILY-WHITE OIL, properly selected for the specific service, aids in reduction of power cost.

Correct lubrication assures minimum friction, long bolster life, and low power consumption in continuous operation.

LILY-WHITE OILS are highly finished spindle oils. They possess stability characteristics to resist deterioration. Viscosity does not increase in use.

These oils are made from selected crudes. Tough film strength and high lubricity are built into the oil through a special refinement.

LILY-WHITE OILS are made in viscosities to suit all package loads and spindle speeds.

SINCLAIR

YOUR NEAREST SINCLAIR AGENT WILL GLADLY ARRANGE

LOW POWER Consumption

TEXTILE LUBRICANTS

FOR LUBRICATION COUNSEL, OR YOU MAY WRITE TO SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

The specially designed face block on Dayton Thorobred Loop Pickers is built to withstand continuous shuttle poundings on today's fastest looms . . . to provide better, more efficient service, at the lowest possible cost.

Wear of lay-in strap is eliminated with Dayton Pickers. Special, molded-in-one-piece construction includes a flared bottom for easy application. Too, a specially patented symmetrical loop construction anchors the picker onto the stick and holds it in the correct shuttle contact position indefinitely. If you aren't using Dayton Pickers, it will pay you to get complete information. Write today to The Dayton Rubber Company, *Textile Division, Woodside Building, Greenville, South Carolina.*

REASONS WHY YOU SHOULD STANDARDIZE ON DAYTON PICKERS

- Loom can be boxed the same at all times.
- Keep their shape.
- Easy to install—fit the stick.
- Hanging fillings eliminated.
- Jerked-in fillings are reduced to a minimum.
- Cut picker costs 50%.
- Built to stand pounding of high-speed loom.
- "Stay put" on stick.
- All pickers uniform in size.

Dayton Rubber

THE HOUSE OF TECHNICAL LEADERSHIP IN NATURAL AND SYNTHETIC RUBBER

50 Candles

We can't pass up the opportunity to tell you that this textile publication is at its half century mark, even though the theme of the issue has been built around "50 Years of Textile Progress." From a small beginning where it wasn't even a 50-50 bet that the weekly payroll would be met on time and we were never certain whether the "receptionist" would announce the sheriff or a customer, the paper grew in service and prosperity. Today it is read by more textile mill men in this country than any other publication in the textile field . . . it has a wide circulation in Canada, Mexico, Latin America, and numerous foreign countries. Although T. I. has had a colorful past, it is to the future that we look with the anticipation that we will enlarge our usefulness to the industry.

◆

A Good Samaritan

Superintendent J. J. McElroy of the Maverick Mills, East Boston, Mass., sent us one of the most interesting letters we have ever read. We believe you will agree with us after you read it, and we only wish we could broadcast the name of the author, but he learned we had a copy of his letter and he asked that we withhold any mention of his name . . . we can understand why, as he would be beset with requests for similar help, and a "hobby to help some of the boys out when I can" would become a real chore. Here's the letter:

"I note in 'Shorts & Remnants' of TEXTILE INDUSTRIES of April 1948 that you ask for an article on Loom Lining. Let me have the pleasure of sending you a copy (carbon) of this article.

"Yes; this article is almost 12 years old, but you see I have the craziest hobby (the S & R editor puts in???) of saving my textile periodicals and indexng the various articles, of which I have several hundred thousands (he then lists the various papers as far back as he has complete files, and T. I. went back to 1930). No, I do not lend them out, as I have had some misfortune while lending out periodicals, as the borrower seems to have forgotten that the book belonged to the other party and failed to return it.

"When I have the time and the article is not too long I try to aid the less fortunate brothers."

To "C. L." we say, mighty fine going.

◆

Thanks From A Technical Man

"Being in charge of a testing office I would like to know what would be the best textile magazine that would help me in my work. I must say that your magazine, TEXTILE INDUSTRIES is of great help to me. However, I would also like to receive a publication from an American textile research laboratory."

RENE BOURRET

Sorel, Que., Canada

◆

Popular Articles

"I have a great interest in the article entitled, 'Cotton Yarn Structure Constants' by Mr. John Duerst in your September 1947 issue. I wish to have the reprints of Mr. Duerst's other articles relating to cotton yarn and roving structure, as I know there were six others appearing in former issues."

LOH CHIA CHU

Ching Foong Worsted Mill
Shanghai, China

(Mr. Duerst's articles were so well received that we cannot even supply tear sheets now. However they can be secured from the Bibliofilm Service, U. S. Dep't. of Agriculture Library, Washington 25, D.C. Refer to September 1947 issue for dates of publication.)

◆

SHORTS and REMNANTS

By M. L. D.

You Have Company

"The superintendent and his supervisory staff at Berkeley Mills like TEXTILE INDUSTRIES because the material is all practical rather than theoretical."

J. A. SMYTH

Superintendent
Berkeley Mills Inc.
Balfour, S. C.

(This is frequently said about T.I. and is the reason 48% of our editorial material is prepared by outside contributors who write from ther own daily experiences.)

◆

Liked Slasher Lubricator Story

"We would greatly appreciate your advising us how we may secure a reprint of your article entitled, 'Mills Say Slasher Lubricator Unit Reduces Warp and Filling Stops' (March 1948)."

ORRIE DE NOOYER

Purchasing Agent
Forstmann Woolen Co.

◆

We Trust Others Agree

"That was a most excellently thought out and expressed lead editorial in the April issue. Indeed, I think the whole magazine gets better and better."

THOS. H. QUIGLEY

Georgia Tech
Atlanta, Ga.

NOW YOU WILL UNDERSTAND

Remember those "not too sad" sheep that appeared on this page last month? Well, here is a sketch of the artist that we asked to prepare them for us. Is it any wonder that our instructions were misunderstood?

A Tip To Associations

Your snooping S&R editor saw a letter expressing regrets that T. I.'s editor, John Fonville, couldn't attend a golf tournament. If they had held a "fishing contest" they would have found Fonville the first arrival . . . and probably the booby prize winner.

◆

Illustrating Long Life of T. I.

"Back in your former magazine 'COTTON' of December, 1939, in the section 'How Other Men Manage' you had an article describing the attachment of a doffer comb onto the underside of a card feed plate and set adjusted to the licker-in. I would appreciate it if you could send me two copies of this article."

JEFFREY J. SHAPIRO

Brookwood Mills
Taylorsville, N. C.

◆

A Standing Invitation

"It was pleasant to notice the well written article on our recent Tenth Annual Meeting (May issue). I thought it was a mighty good recognition of our Association, and the space you devoted to the meeting was very generous. The article itself was accurately descriptive and well illustrated. Let me thank you for your fine cooperation. It was good of you to be with us at the meeting, and you have a standing invitation to be with us at all times in the future."

B. G. STUMBERG

President
Alabama Cotton Mfrs. Assn.

◆

Textile Drying Interest

"We should be obliged if you would forward us a copy of a talk on 'Textile Drying' by Myron T. Fleming, referred to in your April 1948, issue."

DR. W. S. SHAW

Director
Bamford Woolen Mills
England

◆

A Good Service

"We are very pleased indeed with the way you handled the Morgan paper ('Redesigning Production Machinery,' February 1948). We are wondering if you would have readily available 400 reprints of the article. We maintain a welding library in a large number of engineering schools throughout the world to whom we distribute reprints of articles from time to time, as well as send them books on welding as they are published. That is the reason we would like to have these, if they are available."

C. G. HERBRUCK

The James F. Lincoln
Arc Welding Foundation
Cleveland, O.

◆

Carding Interest

"We read with interest the article, 'Theory and Function of the Card,' (Dec. '48). If reprints of this are available, we should like to have one."

H. MURRAY

United States Rubber Co.
Providence, R. I.

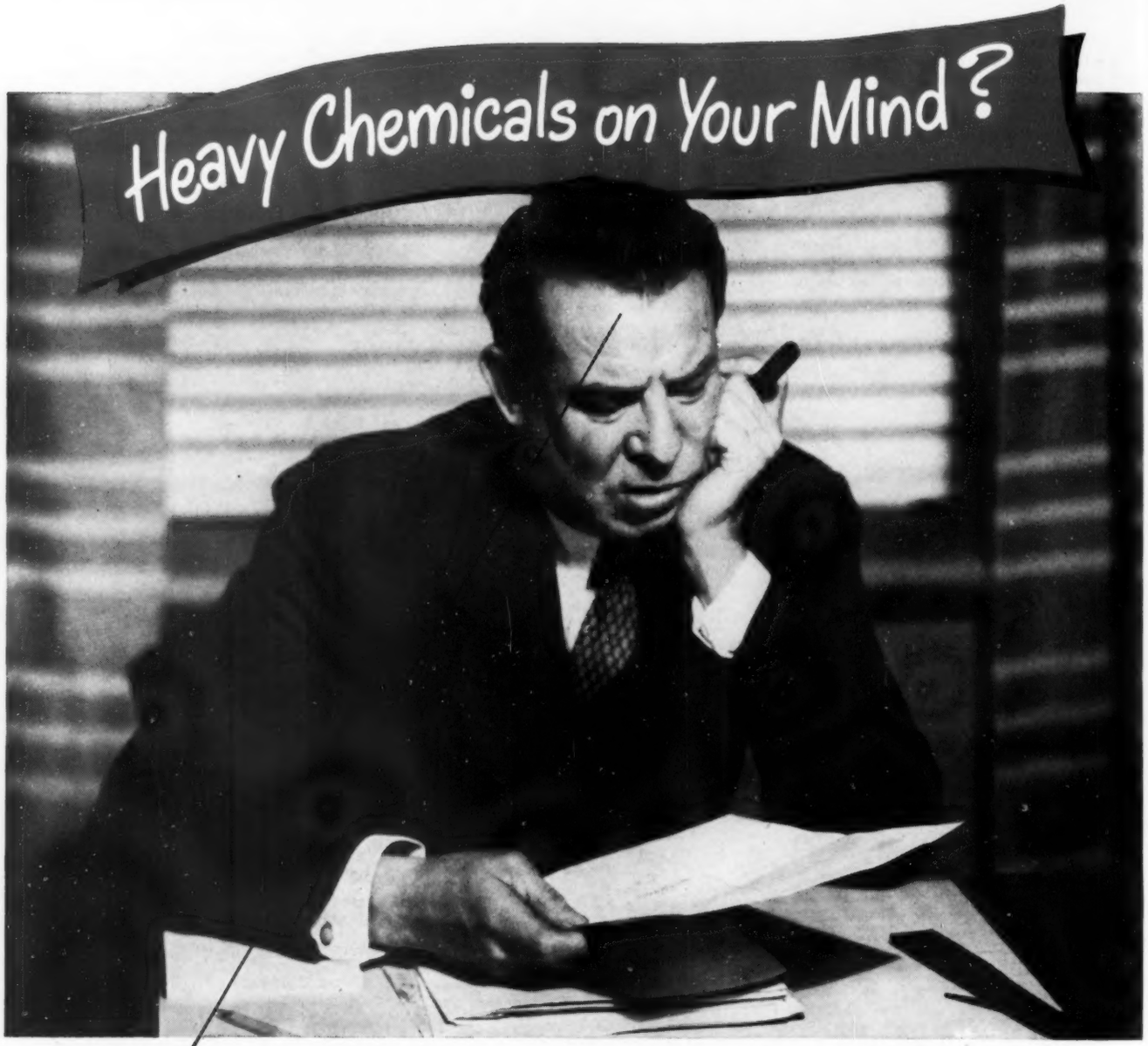
◆

Another Time Study Admirer

"I'll be very appreciative if you will obtain 3 sets of tear sheets of the article on time study and job evaluation that appeared in your May issue.

FRANK L. BYRD

Albertville, Congo Belge.



try Mathieson

We can give you facts on the supply situation that may save you time—the latest trends . . . what's doing in consumer industries . . . how shifting areas of distribution may affect your supplies . . . the possibilities offered by expansion in heavy chemical production.

Such information—including Mathieson's ability to supply you—is yours for the asking. So, if heavy chemicals are on your mind, why not get in touch with us? Mathieson Chemical Corporation, 60 East 42nd Street, New York 17, N. Y., *formerly The Mathieson Alkali Works (Inc.)*

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Caustic Soda . . . Soda Ash . . . Bicarbonate of Soda . . . Liquid Chlorine . . . Chlorine Dioxide . . . Ammonia, Anhydrous & Aqua . . . HTH Products . . . Fused Alkali Products . . . Dry Ice . . . Carbonic Gas . . . Sodium Chlorite Products . . . Sodium Methylate

1898-1948

Our 50th Year

"To you who have made us,

we offer our thanks."

TEXTILE INDUSTRIES is celebrating with this issue its golden anniversary—we're 50 years old. Teddy Roosevelt and tales of his tromp up San Juan Hill were making history when the magazine was born.

In those days and for forty-eight succeeding years it was known as "Cotton," the broader name of TEXTILE INDUSTRIES having been adopted in January, 1947.

The magazine antedates the present staff, but that staff is fully conscious of the reputation established by TEXTILE INDUSTRIES and its whole-hearted acceptance by the industry. And the staff recognizes as its primary aim the serving of the textile industry.

When an institution has reached its golden anniversary, the public expects to hear the celebrator blow his own horn. We're shy on horn blowing. And TEXTILE INDUSTRIES cannot take the credit:—

Since its inception the magazine has not been a separate entity that pretends to guide the industry; it is a phase of the industry—part and parcel and bonded in the fiber—for the man that reads TEXTILE INDUSTRIES also writes it.

It is the common ground for the exchange of practical manufacturing and management information which is disseminated by technicians of the industry to aid their contemporaries.

When the first copy of the magazine was published, the greater portion of the textile industry was located in New England. There were mills in the cotton-growing states, but New England was known as the textile center of the country. Statistics show that in those days there were in southern textile plants only two telephone systems, thirty-seven drinking fountains, two community houses, twenty-five automatic scales, and two hundred and fifty-seven street lighting units. That was in 1898. Today we can see more than that by driving hurriedly through a small textile community.

Times have changed, and both the textile industry and TEXTILE INDUSTRIES have grown, and profited. In 1898 the highly-skilled textile employee made between five and six dollars a week, working 60 hours to do it. This year the Bureau of Labor Statistics reported that the hourly earnings of textile operatives have advanced more rapidly than those of any other leading American industry; at the same time the mills were doing well too.

In 1898 TEXTILE INDUSTRIES was the hope of a publisher with an idea; today the magazine has the largest domestic mill circulation of any textile publication. It has grown with the textile industry, and the textile industry is responsible. It is no longer known as a sectional paper, but is taken by the industry wherever the industry is—in the U. S. and in 52 foreign countries.

To you who have made us, we offer our thanks.

THIS ISSUE carries as the theme "50 Years of Textile Progress." We believe that it will have wide interest to those within the industry, and it should give each of us a keener appreciation of our own industry. But this issue is doing a job that is even broader and, to our knowledge, has not been attempted heretofore. It is an editorial compilation of facts, figures, and information on textile progress which clearly indicates the soundness of textile development.

The issue is being given extra wide distribution, and it is hoped the facts presented may be found useful in interpreting the importance of the industry and its contribution to the welfare of the communities and states in which textile units are located, and to the country as a whole.

We are all part of a tremendous industry. We have a tremendous responsibility to show continuing progress. TEXTILE INDUSTRIES hopes that during the next fifty years it may serve the industry with constantly increasing effectiveness.

JCF

One Million

Marquette

Roller Bearing Spindles

NOW IN OPERATION

Write for illustrated catalog

The Marquette METAL PRODUCTS CO.

CLEVELAND 10, OHIO

SUBSIDIARY OF CURTISS-WRIGHT CORPORATION

Also Manufacturers of: HYDRAULIC GOVERNORS • FUEL OIL PUMPS
WINDSHIELD WIPERS FOR AIRCRAFT, TRUCKS AND BUSES
FUEL OIL INJECTORS • PRECISION PARTS AND ASSEMBLIES

BYRD MILLER, WOODSIDE BLDG., GREENVILLE, S. C. • C. L. WHITE, 213 HILLSIDE AVE., CHARLOTTE, N. C.
WILLIAM P. RUSSELL, BOX 778, ATLANTA, GA. • JOHN J. HALLISSY, 58 LIVINGSTON AVE., LOWELL, MASS.

Cotton Textiles

and the National Economy

By DR. CLAUDIUS T. MURCHISON
President, The Cotton-Textile Institute, Inc.

Cotton—like freedom—is so essential a part of our economy that we take it for granted. Early history traced. Cotton finds new uses.

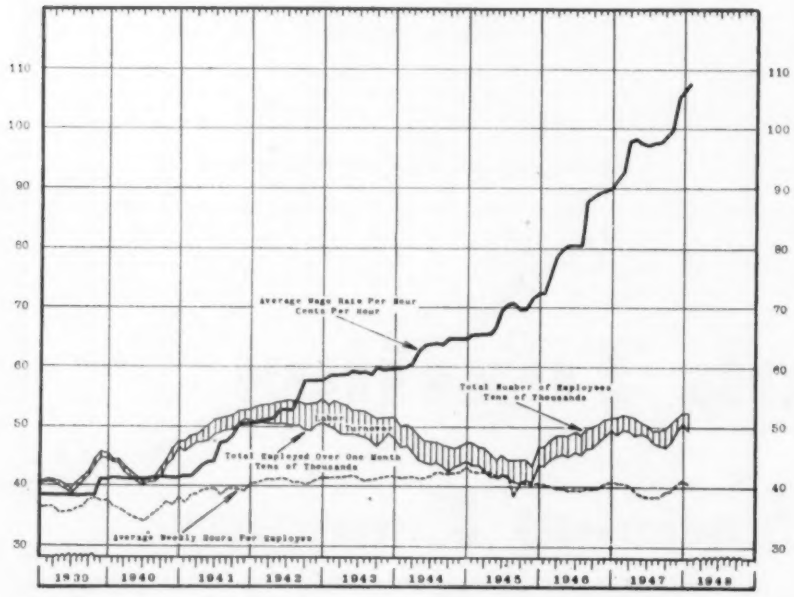
SO ESSENTIAL a part of our economy is the cotton industry and all of its branches and subdivisions from the farm to retail merchandising that there is tendency to take it for granted. This is probably due to the fact that it is the oldest of all of the manufacturing industries, the first to benefit from the discovery of steam power and the launching of the industrial revolution, and a partner and participant in most of the industrial progress achieved since 1790.

Compared with other textile industries such as flax and wool, however, the widespread use of cotton and its application to all forms of economic life is comparatively modern. True, cotton was spun and woven in India two thousand years before the birth of Christ, was known and appreciated in the Middle and Far East for centuries before knowledge of it spread to Europe, but it did not become the clothing of the masses until the industrial revolution. It was the sudden uprush of mechanical invention in the last decades of the 18th century as exemplified by Whitney's cotton gin, Kay's flying shuttle, Hargreave's spinning jenny, and Arkwright's loom that made it possible to process this "tree wool" into materials that could be afforded by most of the inhabitants of the globe.

It is hard to visualize now the veritable revolution in the world economy brought about by the establishment of the Lancashire and American cotton industries. The spread of the industry in England and on the Continent destroyed the last remnants of feudalism and medieval business practices, led to the growth of middle classes, and laid the foundations of the modern industrial age. In New England, it enabled the merchant princes of the Colonial Era to turn away from shipping and importing and to concentrate on the development of their own resources.

Expansion of Cotton Growing 1830-1948. But it was in the South that cotton brought about the most dramatic change in the way of life. The development of the cotton growing industry in the South constitutes an important part of the economic history of America. Whitney's invention of the cotton gin led to a rapid conversion of agriculture in the South Atlantic States from a self-sufficing to a commercial basis, with cotton as the chief source of cash income in the early 19th century.

The years 1830-1860 saw a great expansion of cotton farming in Alabama, Mississippi, and Louisiana, and the Indians were forced to give up their lands, as railroads were built, and, as eastern planters, having virtually depleted the soil in the Atlantic states, moved to the virgin lands farther west. The industry was prostrated by the War Between the States but soon recovered, and in the last quarter of the century came the rebuilding of the fertility of the soils in the eastern states and the conversion of millions of acres of woodland and waste land to cotton



Manpower data for the cotton goods manufacturing industry. Employment, wage rate, weekly hours, and labor turnover are plotted for the period 1939-1948.

land throughout the Belt.

Finally, the first three decades of the present century saw the extension of cotton planting in western and northwestern Texas and Oklahoma, and the conversion of millions of acres from cattle ranches to cotton farms in the great open plains of the Texas Panhandle.

The year after Washington became president, the South raised only about 3,000 bales. In 1825, it grew to 533,000 bales. By 1850, it had increased its output to 2,-136,000 bales. By 1875, it had doubled that figure, turning out 10,123,000 bales. Finally, in 1926 it achieved the record-breaking outturn of 17,997,000 bales. Since 1929, the average yearly output had been reduced by curtailment of the acreage because of the depression, first on the initiative of the growers themselves, but later under government supervision; but in 1931, in the very midst of the depression, the South produced 17,096,000 bales.

The social and economic consequences of the invention of the cotton gin and the application of power to spinning and weaving have been enormous. The crop today on the way to the spinner passes through 12,500 cotton gins powered by steam, electricity, or diesel motors. Cotton had not only led to the opening up and cultivation of millions of acres of land in the United States and the building of hundreds of spinning and weaving mills but has brought about the construction of huge transportation systems, thousands of warehouses, and hundreds of manufacturing plants to provide fertilizer or to utilize the cottonseed.

Cotton Provides Jobs for Millions. Cotton, together with its by-product of cottonseed, normally yields far more cash to the farmers of this country than any other crop. Wheat, which ranks next to cotton in this respect, ordinarily yields less than half as much cash to the grower as cotton does.

Probably 10,000,000 to 12,000,000 persons in this country, chiefly in the cotton growing states of the South, depend for their living on the growing, distribution, and manufacture of cotton and cottonseed—or upon industries or trades which are otherwise closely related to cotton. Nearly a million other employees in this country are engaged all or part of their time in distributing cotton, in manufacturing cotton goods and cottonseed products, or in occupations related to the handling of the crop, such as ginning, compressing, transporting, warehousing, fertilizer manufacturing, banking, and insurance.

Cotton has been the chief export of this country for more than a century.

Textile Manufacturing in U. S. Manufacture of cotton goods on the so-called Arkwright system in the United States began with the establishment of a mill by Samuel Slater at Pawtucket, R.I., on December 29, 1790, a year after the adoption of the Federal Constitution. In 1787 a cotton mill was built at Beverly, Massachusetts, by John Cabot and Associates, but it was not a success. Between then and the War of 1812 many small mills were built in states along the Atlantic seaboard. The blockade of American ports by the British did much to stimulate interest in all kinds of manufacturing, with cotton textiles being among the chief beneficiaries. It was also during this period that European supplies of flax were cut off as a result of the Napoleonic Wars, and this development speeded the transition from linen to cotton fabrics.

Following the Treaty of Ghent and the Battle of New Orleans, commerce with Britain and other countries was resumed. So heavy were imports of cotton goods that most American mills were forced to shut down. However, the industry managed to obtain tariff protection, and from then the growth of the industry until the outbreak of the War Between the States was swift. This conflict disturbed the supply of raw material and labor, and the industry for five years afterwards was stagnant.

Following the reconstruction era, the progress of the industry in the South was rapid. In 1860 the cotton spindles in the South numbered approximately 522,451. By 1900 the number had climbed to 4,500,000. The early progress of the industry in the South was due mainly to proximity of raw cotton supplied, good and cheap water power, low taxation, and a plenti-

ful supply of labor drawn from farms nearby.

It was after the war of 1861-1865 that Worth Street became a worldwide synonym for cotton textile merchandising. Merchant houses earlier had been scattered through lower New York, in Liberty Street, Pearl Street, and other areas. Thereafter, the merchandising arm of textiles became centered in a few blocks in the Worth Street area, where, with a few exceptions, they still remain.

Location and Size of Industry. At the present time about two-thirds of the cotton spinning mills are located in North and South Carolina, Georgia, and Alabama; a quarter are in New England, and the remainder elsewhere. Altogether 34 states from Maine to Texas and California have cotton mills and finishing plants. In all there are about 1200 separate establishments.

The industry reached a peak with 37,885,000 spindles in place on January 1, 1925; on January 1, 1947, it had only 23,816,914 spindles. This looks like a sharp contraction in capacity, but each active spindle in 1947 processed over twice the quantity of cotton than the average active spindle in 1929.

The increased productivity may be explained by two factors, i.e., greater efficiency of machinery and longer hours of spindle operations per wek. The latter development, however, is not due to longer hours worked by employees. On the contrary, the present labor shift of 40 hours is the shortest in the history of the industry. It is largely the practice of running machinery on multiple shifts that accounts for the lengthier operating time per spindle.

Cotton mills vary greatly in size; a mill with less than 25,000 spindles would be called small; mills with 25,000 to 60,000 spindles represent the medium classification; mills with more than 60,000 spindles are, comparatively speaking, in the large company class. Some of the very large mills have as many as several hundred thousand spindles.

A number of important companies in the industry have mills in different areas, and it happens that there are aggregations of spindles under a single management that embrace as many as 500,000 to 700,000 spindles. But even these more important concerns are not in the large corporation class that is found in other industries.

Sustained Demand Since 1945. The most surprising development in the business situation since the end of the war, and one which has confounded the analysts, has been the sustained demand for "soft goods," especially cotton textiles. It is now clear that the forecasters, both government and private, seriously underestimated the demand for all goods, but in no area did estimates prove to be as erroneous as in cotton textiles.

There are probably many reasons for the error; the memory of the prewar buyers' market; the failure properly to evaluate the inability of the industry to expand its productive facilities during the war; the growth in population; and exaggerated optimism over the recovery of foreign textile industries.

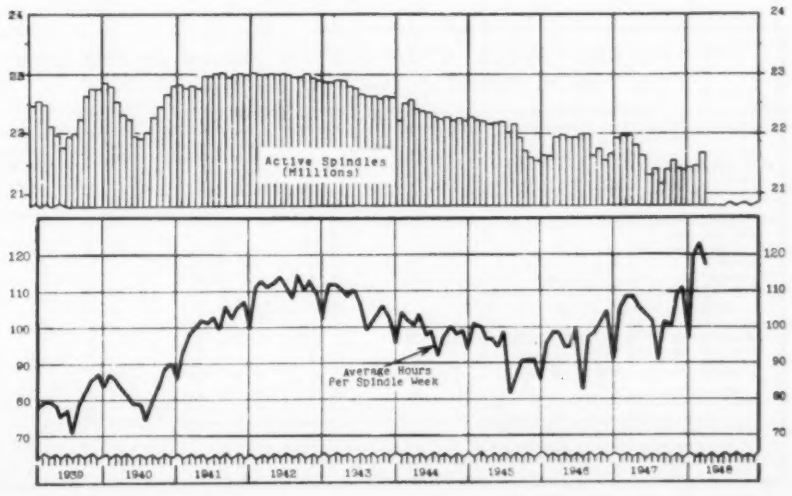
An important reason which has received too little consideration was the extent of the diversion of cotton textiles from civilian consumption to war use, our own and our allies. To be sure, the role of cotton textiles in the war was recognized, but seldom in quantitative terms and in relation to its effect on domestic civilian supply. In part, this was due to the absence of adequate current statistics concerning W.P.B. programs.

In 1942, the peak year of production, only 51% was available for domestic consumption, or approximately 5.6 billion yards. In the two succeeding years, the amount decreased to 39 per cent at the same time that total production declined.

The effect of the diversion upon civilian supply may be measured with a comparison with prewar availability. In 1937 and 1939, which were only fair years, the yardage available for civilian consumption averaged 8,172 million yards as against an average of 4,851 million for the four years 1942-45. Thus, during the war years, when purchasing power was very high, the accumulated loss to the consumers amounted to 13,286 million yards.

It is not to be inferred from the foregoing that the 13,286 million yards diverted from civilian use is an accurate measurement of the cotton textile vacuum created by the war which, in addition to current demand, must be filled before production is in balance with demand. The cotton shirts, sheets, and bags not purchased and, therefore, not worn out will not be replaced by current purchases of an equal number. It does, however,

Spindle activity for the period 1939-1948. Average hours per active spindle week and average active spindles are indicated.

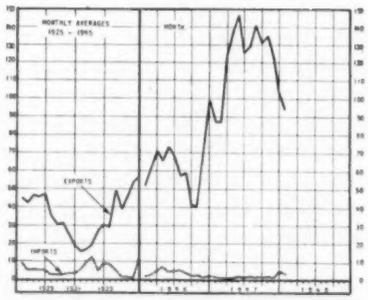


give a reasonably accurate measure of the drains made on both commercial and consumer inventories and the apparent limited extent to which they have been restored.

It should also be noted that the foregoing calculation is based upon availability during 1937 and 1939, a decade ago when both total population and number of families were considerably below the current figures. Since 1939, the population of this country has increased from 130 million to 145 million.

Cotton in the National Economy. Cotton is not only the cornerstone of the economy of the South—but is a major balancing factor in the national economy as well. Upon the maintenance and prosperity of southern cotton depend the maintenance and prosperity of Wisconsin dairying, of Michigan automotive manufacture, of Minnesota wheat growing, of Iowa hog production, and the California canning industry, since the South can grow and manufacture all of the articles for which these states are famous—whereas cotton can be grown efficiently only across the tier of seventeen states stretching from the Carolinas on the East to California in the West.

More than a thousand major peacetime uses for cotton are known. It is a matter of record that 99 per cent of the world's population uses cotton in one form or another. Some statisticians have estimated that 90 per cent of



Exports and imports of cotton cloth. Millions of square yards.

the clothing worn in the world is cotton. In normal years, cotton accounts for more than three-quarters of the poundage of textile fibers—cotton, wool, rayon, silk, jute, and flax—used in the United States.

Some Facts About Cotton. Not only has cotton the advantage that it can be washed and boiled and sterilized and starched, but it has the protective qualities equally valuable. A thread of cotton is stronger than a thread of wrought iron of the same circumference. Yet this strong fiber can be dissolved into a liquid. The fiber will absorb 14 times its weight of water, but it can be woven so closely that it is wind-resistant. It can be spun so fine that a pound of cotton thread will extend more than 150 miles, or it can be spun so coarse that a cord of it will reach only a few hundred yards.

It can produce textiles that are strong and tough and others of gossamer texture. It can be used alone to make fabrics, but these can be filled, coated or treated with chemicals for the special needs of industry. It is so combustible that it is used to make explosives, yet it can be so treated that clothes made from it are "fire-proof."

Cotton Uses. Americans wear cotton at home, in the office, the workshop, in the field, and at play. They sleep surrounded by cotton, between cotton sheets, under cotton blankets, and on cotton encased mattresses with their heads resting on pillows having a double cotton covering. They have cotton towels and wash cloths in the bathroom, cotton drapes and shades at the windows, cotton upholstered furniture with removable slip covers, cotton rugs, cotton towels and dish cloths in the kitchen, cotton bags for fruits, vegetables, sugar and many other edibles—cotton in every room in the house and in every wardrobe.

Cotton supplies medical science with bandages and other materials for the relief of pain and suffering while, paradoxically enough, as a base for death-dealing explosives, it is a major war material. As an explosive, it is essential in mining, road building, and agriculture. Cotton enters in the production of motion picture film, celluloid, and scores of other items which contribute to the everyday comforts and pleasures of man. Cotton seeds, crushed, provide the oils for salads and soaps, food for cattle and poultry, and fertilizer for soil.

Cotton long has been sold in lieu of other fabrics because of its lower price. In tires it sells on merit for its strength; in many industrial and consumer uses it is preferred for its quality of increased tensile strength when wet; in surgery and medicine it is supreme for its ability to stand scrubbing, bleaching, and sterilizing. Tomorrow it will be equally accepted on merit for the new, largely unsuspected properties and finishes now being developed by painstaking research.

Of the normal annual production of cotton in the United States approximately 60 per cent was consumed by American mills in the prewar period. Since early

COTTON AND RAYON (SPUN SYSTEM) MILLS IN THE U. S.
By Type of Operation and by State (Feb. 28, 1942)

Courtesy, Bureau Census, Industry Division

STATE AND REGION	Total mills	Spinning, but no broad fabric weaving[1]	Spinning and broad fabric weaving	Broad fabric weaving only
Total	1,329	356	549	424
Cotton Growing States	847	315	451	81
North Carolina	366	215	116	35
South Carolina	171	20	137	14
Georgia	135	36	90	7
Alabama	77	23	52	2
Other Cotton Growing States[2]	100	21	56	23
New England States	183	28	78	77
Massachusetts	89	18	40	31
Connecticut and Rhode Island	70	9	21	40
Maine, New Hampshire, Vermont	24	1	17	6
Middle Atlantic States[3]	283	10	16	257
Midwestern States[4]	16	3	4	9

[1] Includes knitting mills, thread mills, narrow fabric mills, etc., which produced yarn for their own use.
[2] Includes Arkansas, California, Kentucky, Louisiana, Mississippi, Oklahoma, Tennessee, Texas and Virginia.
[3] Includes Delaware, Maryland, New Jersey, New York and Pennsylvania.
[4] Includes Illinois, Indiana, Michigan, Ohio and Wisconsin.

1940 the great bulk of home-grown cotton has gone into products manufactured by American mills. Over the last five years mills in the United States have consumed more than 80 per cent of the crop.

Per Capita Consumption. In normal years about 40 per cent of the cotton consumed by mills is absorbed by industry in the production of other goods or commodities. Another 40 per cent goes into apparel, and the remaining 20 per cent into household cottons. During the twenty year period before the war, the production of cotton goods did not go above 33.2 pounds per person per year, nor below 19.2 pounds. In 1941 it rose to 36.9 pounds per person, and in 1942 to 41.8 pounds per capita, an all-time high.

Automotive Industry a Customer. American industry, in the production of other goods and articles of commerce, normally absorbs about 40 per cent of the cotton manufactured in the United States. The automobile industry alone takes about 9 per cent of the American cotton mills' production in the form of tire cord, upholstery fabrics, webbings, wire and cable insulations, timing gears, fan belts, and a score or more of other items.

The assembly of every million cars is estimated to require the production of about 400,000 acres of cotton farms. The pneumatic tire casing whose strength and life —now vastly improved by a new type of heat-resistant cord fabric —is dependent on cotton, accounts for the consumption of about five pounds of raw cotton. In a single tire, the cord fabric is the equivalent of more than two miles of cotton cord yarns. About 90 pounds of cotton go into the production of the average passenger car.

In important measure, too, cotton—though its identity may be obscured — serves other great manufacturing industries. The production of electrical equipment and appliances, shoes, furniture, rubber and pyroxylin-coated fabrics for a host of purposes—luggage, aircraft, to mention a few—all account for cotton consumption in great volume. Incident to the operations of the dairies, fisheries, and packing houses—the sources of the principal elements in our daily diets—cotton textiles have widespread use. Other very important, but generally unseen, uses of cotton textiles in industry are presented by the heavy filter cloths that are extensively employed in the petroleum, paint, chemical, and food manufacturing industries.

Another factor which contributes to the consumption of cotton is the American fetish for cleanliness. That demand for scrupulous cleanliness finds expression in Federal statutes, state laws, and local ordinances of a wide variety, and setting even more exacting standards is the force of public opinion. The result has been a tremendous and steadily increasing demand for cotton textiles and the creation of a relatively new industry miscalled the linen supply trade, which supplies not only cotton uniforms and towels for workers in offices, factories and professions, but also cotton tablecloths and napkins for hotels and restaurants.

The importance of this outlet for cottons may be gauged by the fact that replacements and expansion of this service, developed without any definitely organized effort, now account for the annual absorption of approximately $25,000,000 worth of cotton textiles.

Work Uniforms. But in this field of new uses for cotton there is probably none that holds greater promise than the market for uni-

COTTON AND RAYON (SPUN SYSTEM) MILL MACHINERY IN THE UNITED STATES

Based on results of wartime inventory of principal machinery used in the spinning and weaving of cotton, silk, rayon, and other synthetic fibers in the U. S. Note: This inventory covers mills primarily engaged in spinning of yarn or weaving of fabrics over 12 inches in width from cotton, silk, or synthetic fibers. Cards, combs, and spindles in place in knitting, thread, and narrow fabric mills producing yarn for their own use are also included; but the narrow fabric looms are not included.

Number of Machines in Place, by Kind and by State (February 28, 1942*)

Courtesy, Bureau Census, Industry Division

STATE AND REGION		Cards	Combs	ROVING MACHINERY				Spinning spindles	Twisting spindles	Looms
				Slubbers	Speeders	Intermediates	Jacks			
United States	Total	90,582	7,245	637,529	1,962,868	700,060	524,948	24,185,947	3,427,293	522,127
	Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Cotton Growing States	Total	72,141	5,628	524,619	1,493,816	520,330	232,444	18,184,663	2,612,963	363,376
	Percent	79.6	82.8	82.3	76.1	74.3	44.2	75.2	76.3	69.7
North Carolina	Total	24,339	2,591	181,786	539,540	162,410	148,002	5,861,613	1,175,489	65,585
	Percent	26.9	35.8	28.4	27.6	23.2	28.2	24.2	34.3	18.4
South Carolina	Total	16,969	499	129,672	491,417	136,000	17,768	5,620,037	364,376	144,770
	Percent	18.7	6.9	20.5	25.1	19.4	3.5	23.2	10.7	27.7
Georgia	Total	15,692	264	124,558	224,347	103,000	9,668	3,154,958	648,122	54,404
	Percent	17.3	3.6	19.5	11.4	14.7	1.8	13.1	18.9	10.4
Alabama	Total	8,365	180	72,405	104,520	50,276	18,120	1,813,718	224,414	34,870
	Percent	9.2	2.3	11.4	5.3	7.2	3.5	7.5	6.5	6.7
Other Cotton Growing States	Total [1]	6,776	306	56,198	133,992	68,644	38,886	1,734,341	202,488	43,949
	Percent	7.5	4.2	8.7	6.8	9.8	7.4	7.2	5.9	8.5
New England States	Total	15,441	3,219	90,686	392,722	156,412	282,780	5,297,814	725,078	117,020
	Percent	17.1	44.5	14.2	20.0	22.3	53.9	21.9	21.1	22.3
Massachusetts	Total	8,671	2,171	46,228	269,976	98,220	195,692	2,992,490	406,150	56,790
	Percent	9.6	30.0	7.3	13.8	14.0	37.3	12.5	11.8	10.8
Rhode Island, Connecticut	Total	3,179	798	16,864	71,592	27,412	73,512	1,301,520	264,860	35,029
	Percent	3.5	11.0	2.6	3.6	3.9	14.0	5.4	7.8	6.7
Maine, New Hampshire, and Vermont	Total	3,591	250	27,594	51,254	30,780	13,576	1,003,804	53,068	25,201
	Percent	4.0	3.5	4.3	2.6	4.4	2.6	4.2	1.5	4.8
Middle Atlantic States	Total [2]	2,618	150	18,308	64,058	20,084	8,212	589,436	87,372	39,483
	Percent	2.9	2.5	2.9	3.3	2.9	1.6	2.4	2.5	7.8
Midwestern States	Total [3]	304	18	3,916	12,272	3,234	1,512	114,084	3,980	2,248
	Percent	.4	.2	.6	.6	.5	.3	.5	.1	.4

[1] Includes Arkansas, California, Kentucky, Louisiana, Mississippi, Oklahoma, Tennessee, Texas and Virginia.
[2] Includes Delaware, Maryland, New Jersey, New York and Pennsylvania.
[3] Includes Illinois, Indiana, Michigan, Ohio and Wisconsin.

*Since 1942 there has been a slight decrease in machinery in place. Inventory for March 1946 shows: cards, 90,542; combers, 7,067; spinning spindles, 23,871,893; and looms 506,123.

forms and other garments for industrial, office, and store employees. Entirely aside from the point of cleanliness, it is recognized that employees in uniforms are more efficient, with a distinctly improved morale.

More than that, safety is another end which is directly served by uniforming employees, particularly in steel mills and other plants where the atmosphere is frequently beclouded by vapors, gases, or steam.

Aside from novel military uses, the most significant development in cotton consumption in recent years is the swift growth of consumer appreciation of the comfort and other qualities of apparel cottons. Gaining expression on a notable scale in 1929, an increasing demand for apparel cottons—in both men's and women's wear field—bolstered consumption of cotton during the depression years when the demand in industrial fields was drastically curtailed.

A decade or so ago, cotton fabrics were mostly utilitarian. They had little beauty. They were the Cinderellas of textiles—indispensable in industry and in the kitchen, synonymous with overalls, work shirts, and calico, but never mentioned or tolerated in the world of fashion.

The transformation of cottons from that lowly rank to the commanding position they now occupy in the field of fashion and in the home is a modern miracle. Old prejudices have been overcome by science and manufacturing genius—cottons have achieved style, color, and beauty to combine with their admitted practicability and economy. Pre-shrunk, permanent starchless finishes, air-conditioned, anti-crease, water-repellent, and other modern cottons, undreamed of a scant twenty years ago, are today available in crossroads village stores.

COTTON AND RAYON (SPUN SYSTEM) MILL MACHINERY IN THE UNITED STATES

By Size Groups and by State (Feb. 28, 1942)

Courtesy, Bureau Census, Industry Division

STATE AND REGION	NUMBER OF SPINNING SPINDLES IN PLACE										
	Total mills	Up to 1,000	1,001 to 5,000	5,001 to 10,000	10,001 to 20,000	20,001 to 30,000	30,001 to 40,000	40,001 to 50,000	50,001 to 75,000	75,001 to 100,000	Over 100,000
United States Total.....	405	9	65	165	287	135	70	53	68	29	24
Cotton Growing States.....	766	4	58	153	281	121	55	44	43	16	13
North Carolina.....	331	1	20	94	133	47	15	10	7	2	2
South Carolina.....	157	1	4	10	31	40	25	18	17	7	4
Georgia.....	126	1	12	22	44	18	9	6	10	2	4
Alabama.....	75	—	5	5	32	9	5	7	4	3	1
Other Cotton Growing States[1]..	77	1	15	18	21	9	1	3	5	2	2
New England States.....	108	4	8	5	15	9	13	8	24	11	11
Massachusetts.....	58	3	2	3	7	4	6	5	17	4	7
Rhode Island and Connecticut..	30	1	4	2	4	4	3	2	5	3	2
Maine, New Hampshire and Vermont.....	18	—	2	—	2	1	4	1	2	4	2
Middle Atlantic States[2]....	26	—	—	6	12	3	1	1	1	2	—
Midwestern States[3].....	7	1	1	1	1	2	1	—	—	—	—

STATE AND REGION	NUMBER OF LOOMS IN PLACE										
	Total mills	Up to 100	101 to 200	201 to 400	401 to 600	601 to 800	801 to 1,000	1,001 to 1,500	1,501 to 2,000	2,001 to 3,000	Over 3,000
United States Total.....	972	298	125	174	96	64	59	75	32	38	11
Cotton Growing States.....	531	73	51	123	80	55	46	49	22	26	6
North Carolina.....	151	20	21	39	27	14	15	8	2	3	2
South Carolina.....	150	12	5	19	21	24	17	28	12	12	2
Georgia.....	97	22	11	23	15	6	7	5	5	4	1
Alabama.....	54	4	2	18	11	6	4	5	1	3	—
Other Cotton Growing States[1]..	79	15	14	24	6	5	3	3	2	4	1
New England States.....	155	41	19	25	8	4	11	22	9	11	5
Massachusetts.....	71	18	8	12	2	2	4	14	3	5	3
Rhode Island and Connecticut..	61	20	9	9	4	2	6	6	1	3	1
Maine, New Hampshire and Vermont.....	23	3	2	4	2	—	1	2	5	3	1
Middle Atlantic States[2]....	273	176	53	25	7	5	1	4	1	1	—
Midwestern States[3].....	13	8	2	1	1	—	1	—	—	—	—

[1] Includes Arkansas, California, Kentucky, Louisiana, Mississippi, Oklahoma, Tennessee, Texas and Virginia.
[2] Includes Delaware, Maryland, New Jersey, New York and Pennsylvania.
[3] Includes Illinois, Indiana, Michigan, Ohio, and Wisconsin.

The shapeless calico wrapper of other days has given way to the styled cotton house dress, and well-dressed women delight in cotton sports clothes, cocktail frocks, and evening gowns.

Fortunately for the men, summer fashions no longer demand that they be uncomfortable, and the result is that increasing numbers of men each summer find smartness and comfort combined in cotton summer wash suits or slacks.

A significant war development was the creation of simple, smart, functional and inexpensive work garments for the millions of women workers in the nation's aircraft, ship building, and armament industries. For these tasks a new type of women's wear was required, and the cotton industry soon supplied it.

While these wonders were being wrought in the field of apparel cottons, a similar development in household cottons was in progress.

Colors and Cottons. No appraisal of improvements in the manufacture and finishing of cotton textiles would be complete without some detailed reference to the remarkable advances, first, in the manufacture of fast-color dyes, and, second, in their application. The skillful mastery of colors on the part of textile technicians has had a far-flung influence that it is impossible to evaluate. This development contributed substantially to the acceptance of styled cottons for women's wear.

Other branches of the cotton textile industry also began to study the possibilities of color in connection with their own products. As a result, we see colors today a predominant sales influence in such commonplace articles as bed sheets and pillow cases, terry-cloth towels for the bath, and even dish towels for the kitchen. The styling of these items through color has increased production within the industry because it has stimulated the turnover of retail stocks and replacements of these items in individual households at a much faster pace than could be effected in any other way except by lowering quality to shorten life.

The industry sponsored and contributed heavily to the construction of this vocational school at Belmont, N. C.

What the Textile Industry Means to a State

By **HUNTER MARSHALL**
N. C. Cotton Manufacturer's Assn., Inc.

The textile industry influences the economic, cultural, and social life of a state and a community. North Carolina and Georgia cited.

THE TEXTILE industry is located geographically along the Eastern Seaboard of the United States; it has had a tremendous influence on the economic, cultural, and social aspects of those states in which it has grown.

The textile industry offers the necessary balance between agriculture and industry that is so necessary to the proper development of the community and the state.

It is a progressive industry, not only from the viewpoint of manufacturing technique and humanized personnel relations, but from its active participation in and contribution to the welfare of the state.

Space does not permit in this issue a study of the textile industry's contribution to each and every textile state, so the story of the textile industry of North Carolina will be the example selected. Although other states do not have as many spindles as North Carolina, the textile industry's contribution to the economic, cultural, and social life of those states is no less important.

North Carolina's Largest Industry. The North Carolina Piedmont is the center of tobacco manufacturing and the center of southern

furniture manufacturing. About three-fourths of America's cigarettes are made here. Yet, with all this, the predominant industry is textiles—textiles, the state's earliest industry and still by far its largest. Though the textile industry now covers a larger part of the state than the Piedmont, it is still concentrated mainly in this area.

Early Textiles. Most authorities agree the first cotton mill in North Carolina and probably the first below the Potomac was built in 1813 on a small stream near Lincolnton by Michael Schenck, a native of Lancaster County, Pennsylvania, who came to North Carolina in the 1790's. Some of the machinery for the mill was purchased in Providence, R. I., and hauled by wagon from Philadelphia. Other parts were made in Lincolnton by Absolom Warlick, a skilled worker in iron.

In the next two decades a dozen or more mills sprang up in the central part of the state. The names of these pioneers in textiles are still prominent in the life of the state today. In 1840 there were 25 mills in operation in North Carolina. The total number of spindles was 47,900. There were less than 1,500 operatives. Many of the mills ran only a part of the year. Quite often the water-power was imperfectly utilized, and the mills had to stop running when the streams were abnormally high or low. Each mill was its own distributor and depended chiefly upon local demand.

Industry Destroyed by War. When the Civil War broke out the state had less than $1,500,000 invested in cotton mills. This seems small today, when one relatively small mill represents a far greater investment than that. Even so, only a few of the cotton mills—so vital in wartime, even then—escaped destruction in the conflict between the states. The few which did survive were worn by the strain of wartime production just as are mills today, which are spending vast sums on modernization and replacement of over-age machinery.

But back then, to all practical purpose, the North Carolina textile industry was wiped out. The whole economic system was disarranged, and there was no new capital. But by 1870 the industry was beginning to rebuild and to expand. There was no help from outside. It was done by the people themselves—people who had always been used to work, people who had not gotten into the work habits of the plantation system. A Winston Churchill of the day might have called their job one of "work, sweat, and tears."

Many or most of the mills were small community affairs. Farmers, doctors, school teachers, butchers, and candlestick makers invested in them, maybe buying a share or shares on the installment plan. Mills sprang up in little towns in which no one could be considered comfortably wealthy even by the standards of those days. In later years several large mills were built with foreign capital but not in this period of the region's own rebuilding.

The development of the means to transmit electricity long distances came in the last decade of the last century. By the middle 1890's other towns, not even situated on streams, wanted mills. And they built them. The first mills had to seek shoals for power. Without the new technology of hydro-electricity, mills would probably have been concentrated at the larger water power developments.

With such a background it is not hard to understand the friendly relationships which characterize the industry until this day. Capital and management and labor rose from the region's own people and resources, and the mills were run along rather human lines. The growth of industry relieved the struggle for existence on agriculture, and people left the farms for the mill communities where they could get some cash and have a part in the social life the towns and communities afforded.

Economics. Yesteryear and Today. Compare the approximately 48,000 spindles in North Carolina in 1840 with over five and a half million today. The state turns out ten billion square yards of cloth annually, slightly more than a

A typical house in the cotton mill town of Cramerton, N. C. The houses have recently been sold to employees at a fraction of what it would cost to build them today.

fifth of the nation's total. Compare the few hundred operatives in 1840 with the number today—about 220,000. In fact, two out of every three industrial operators in North Carolina are employed by the textile industry.

Although only about a fourth of textile operatives are in the classification of "skilled," the average weekly and average hourly earnings of textile operatives are higher than those for all manufacturing industry in the state, according to statistics of the U. S. Department of Labor. And North Carolina is a state of relatively diversified industry, with many industries requiring a quantity of skilled people.

Since September 1939, the wages of North Carolina textile operatives have increased about 186 per cent. The buying power of the operatives has increased tremendously. For, according to latest Department of Labor figures available at the time this is written, the cost of living in the same period rose only about 63 per cent. Today textile operatives are very near the top of the southern wage picture. Only in a very few industries in the South do workmen receive over the average hourly wage of $1.04 that prevails in the industry as this is written.

Working and Living Conditions. So, economically, in payment of wages and taxes, the textile industry has had a large impact upon the life of the state. But traditionally, in North Carolina as well as in the other southern states, mills do more than just process fibers. They process citizens. The last half century has brought almost unbelievable progress in working conditions. and sick benefits and paid vacations are by far the rule rather than the exception.

Not all mills own the homes in which a part of their employees live. But among those that do, housing conditions have improved greatly. In the industry it is possible to find duplicates of homes built and sold to veterans for $8,000 being rented to operatives for $2.50 a week.

Some mills have built modern cafeterias for their employees. A few provide summer outdoor camps for children of the employees. Nearly all have recreation centers, athletic directors, kindergartens, and the like. Mills which are in a community to themselves have often built and donated school buildings to the county. It is not unusual for mill communities to provide school supplements.

Industry Sponsors Education. The textile manufacturers in North Carolina have been one of the moving spirits behind the fostering of a fine public school system. For more than a half century the industry in North Carolina has been building upon the theory that compulsory education and happy living conditions are vital to progress.

The records and minutes of the North Carolina Cotton Manufacturers' Association are filled with resolutions, committee reports, and presidential addresses urging a stronger compulsory school law and rigid compliance with the existing law. Since the association was organized in 1906 there has hardly been a meeting that members haven't urged the strengthening of the law in this respect.

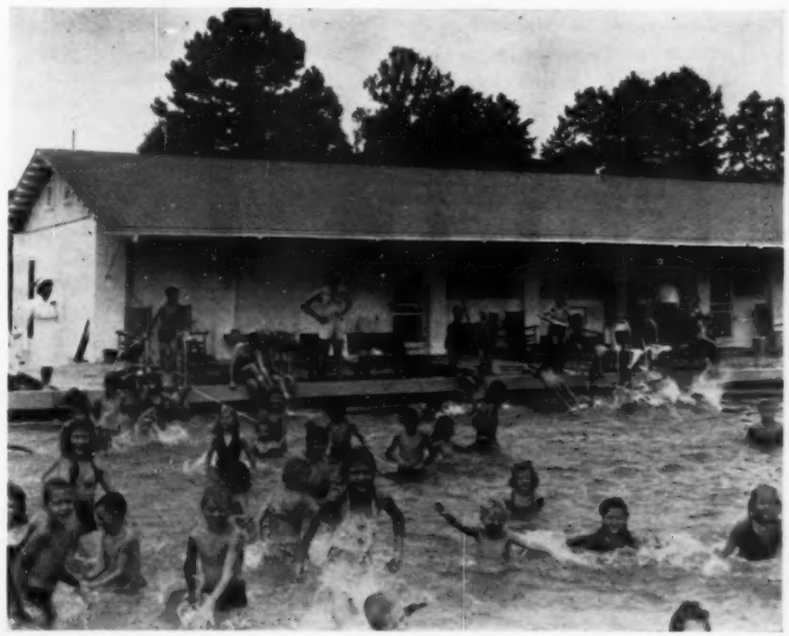
The minutes of the association are permeated with efforts to obtain passage of adequate child labor and compulsory education laws. Each year since the turn of the century has brought improvement in education, as well as in working and living conditions.

Not only have the mills worked for over a generation to improve the educational status in North Carolina, but have sought to stimulate boys and girls to finish high school and have offered incentives for them to go on to college.

So much for the past.

The Future. There are two trends in the industry, in North Carolina and elsewhere, which unmistakably argue well for the future. One is the program of modernization and replacement of old machinery. Trade sources estimate the whole industry will spend as much as a billion dollars in this program in the next five years. Existing plants are being improved, whereas after the first world war there was a period of mushroom expansion.

The other trend is toward research. Many times more is being



The kiddies enjoy both morning and afternoon periods in the large swimming pool at a summer camp provided for children of employees by Carlton Yarn Mills at Cherryville, N. C.

spent on research today than ever before. The textile schools, at or below the college level, are literally bursting at the seams. Textiles is becoming definitely a career industry, and there is inclination to hope, if not believe, that by research and modernization textiles can get away from a "boom and bust" cycle.

Research and higher textile education go hand in hand. North Carolina has the world's largest college level textile school in the School of Textiles at N. C. State. Recently the industry in North Carolina has contributed over $800,000 to a foundation, the purpose of which is to obtain the best professors available for N. C. State. This year the enrollment at N. C. State's school of textiles was around 850, the largest of all time. Plans are under way for a large physical addition to the school.

Similar foundations such as is found at N. C. State have also been formed for the textile schools at Clemson College in South Carolina and at Georgia Tech in Georgia.

Some of the mills grant scholarships to N. C. State. Also some mills in North Carolina have long sponsored rather extensive vocational training programs. Recently the industry sponsored and contributed heavily to the North Carolina Vocational Textile School at Belmont, midway between Gastonia and Charlotte. Here ex-GI's are taught textile skills. Here high school students come for textile courses. Here operatives in the surrounding mills go to school and fit themselves for a better job. Buses pick them up at mills or schools and return them.

The textile industry has meant much to North Carolina and its development. And North Carolina has meant much to the textile industry and its progress. But this could never have been possible if North Carolina had been inclined to impose conditions upon the industry at various stages of development which would have put the mills of North Carolina at a competitive disadvantage with those in neighboring states.

We have given the reader the historical background of the textile industry in North Carolina and we have show its progress and its participation in civic affairs. As stated at the outset, the textile industry in other states is doing a comparable job. Here are some facts about the textile industry of Georgia, which is neither the largest nor the smallest textile state:

Georgia's Textile Industry. Textile manufacturing is Georgia's oldest and largest industry. There are 175 spinning, weaving, and finishing plants operating more than three million spindles. One hundred thousand operatives are employed in Georgia's textile mills, and during recent months some 1,200 new jobs were provided by the industry.

Taking into consideration the 100,000 employees in the mills, together with their families and dependents, at least one-sixth of the state's white population is dependent upon the textile manufacturing industry for the family income.

During 1946 Georgia textile mills paid out a total of $190,000,000 in wages, meaning that nearly four million dollars are distributed weekly in the textile mill communities of the state, and providing the state with its greatest single source of wage income.

Studying the consumption of raw materials, we find that in cotton manufacturing alone the Georgia textile mills used an average of 2,100,000 bales of cotton per year for the last five years, while during that period the Georgia farmers grew an average of only 741,000 bales of cotton. The textile plants consumed three times as much cotton as was produced by the farmers of the state.

Thus, further emphasis is given to the textile industry's importance to its state.

No one can pretend to predict the future. But everything seems to argue well for sound and steady progress. For the need of textiles is basic, and the technological genius of the textile industry is working constantly to maintain the high standard of living of the textile operative in a highly competitive industry that is world-wide. Only through research and efficiency in production can the job ever be done.

In Retrospect

(Textile Industries, February '07)

Last Friday afternoon the superintendent had trouble with a drunken workman, who drew a knife and attempted to cut him. The superintendent knocked the man down and threw him out, after taking away his knife. Later the superintendent was warned that [the workman's] two brothers were armed and waiting for him.

Nevertheless the superintendent went quietly on his way home armed with nothing but a spinning roll. As the superintendent approached the brothers, they advanced on him with shot guns.

The superintendent knocked the foremost one down with his spinning roll, seized the gun just as it was fired, jammed the barrel between his legs, where he held it, and in the meanwhile with his free hand seized the gun which the other man was pressing against his side and broke it, so that it was put out of action. He then knocked one of them senseless with the gun, while the other fled, and then peacefully went about his business.

The superintendent is now thirty-six years old and has been working in the mills continuously for twenty-eight years.

Rapid Progress Rayon Industry

By SPECIAL CORRESPONDENT

Statistics and charts courtesy, Textile Economics Bureau, Inc.

Phenomenal growth of the rayon industry is traced. Greatest growth during 1938-1948.

THIRTY-FIVE years ago, in 1913, the United States production of rayon synthetic yarns and fibers amounted to less than 1,800,000 pounds. Each year, with the exception of the years 1932 and 1934, domestic production increased until in 1947 the total production of synthetic yarns and fibers came to the impressive figure of 975,100,000 pounds.

In addition to this poundage, approximately 37,000,000 pounds of synthetic yarns and fibers were imported from several foreign countries. As many rayon and acetate manufacturers are increasing their production at the present, it is thought that the United States production of synthetic yarns and fibers will pass the billion pound mark before the end of 1949.

These poundage figures include the viscose, the acetate, and the cupra-ammonium processes. They do not include the production of nylon, protein, or vinyon-type yarns and fibers. Nylon filament and staple production is expected to reach 25,000,000 pounds by the end of 1949. Actual vinyon production is not available.

Reasons for Growth. Rayon and synthetic fibers of all types are known as man-made, scientifically engineered fibers, and yarns. Science and engineering very seldom stand still; they move forward to improve products, introduce economies, and broaden their markets.

In Europe it was a different picture so far as synthetics were concerned. Natural fibers were scarce and expensive when they were imported. The European mills needed a fiber to replace imported cotton and wool.

In the United States natural fibers were cheap and plentiful. Rayon and the synthetic fibers could not compete with the natural fibers in the early days of rayon manufacture. The rayon industry experienced many difficulties during the first ten years of the struggle to develop a market.

Rayon Industry Progress. During the early twenties and up until the depression years of 1930 many improvements were made in the line of synthetic fibers. The products were accepted as more than just a substitute for real silk. The industry began an intelligent approach to its problems, and the processing problems of the textile mills. From 1932 onward the rayon industry made great strides in its progress. Prices were reduced very often due to plant economies, and the fabric technicians learned to use the various types in their proper places.

The price reductions of the synthetic fibers and yarn was one of the most important factors that led to the growth of the industry.

To get a clearer picture of the remarkable growth of the synthetic textile industry, see Chart No. 1, which illustrates an interesting trend.

The rayon industry showed the most growth during the past ten years. The viscose yarns and staple and the acetate yarns and staple developed independently of each other, and neither seemed to be affected by the growth of the other. In 1937 the acetate process produced 25% of the total filament yarn. It made a slight increase to 28% by 1947.

The acetate staple fiber in 1937 was only 18% of the total fiber produced, but in 1947 the poundage was increased to 26% of the total staple fiber.

One reason for the growth of the viscose industry was its use in the tire cord industry. In 1937 less than 1,000,000 pounds of viscose yarn were used in the tire cord industry. By 1947 this had increased to 227,500,000 pounds of filament viscose yarns, or approximately 40% of the total viscose filament yarn produced. The production of synthetic tire cord has been impressive, and it is well to keep in mind that it is about the same poundage as one-half million bales of cotton. There are several new plants under construction to produce additional tire cord.

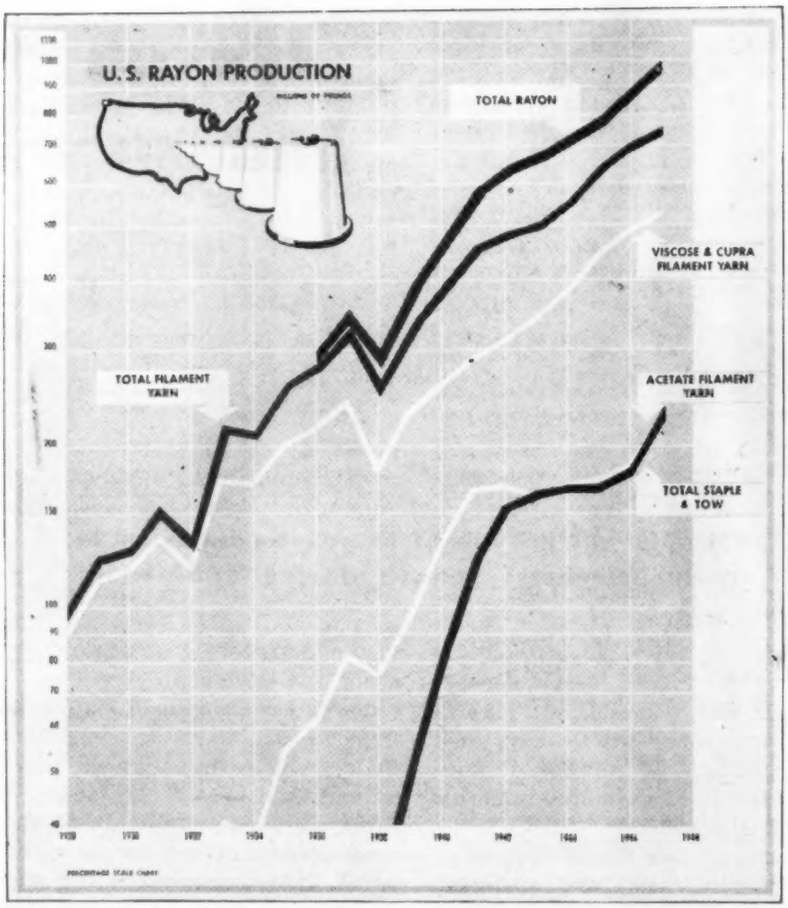


Chart No. 1, showing U. S. rayon production for the period 1929 to present. Units are millions of pounds.

From the foregoing it can be seen that a considerable portion of the increased production of viscose filament yarn went into the tire cord and allied fields. During this same period the acetate section of the industry increased its production and broadened its fields in the knitting and weaving markets.

Machinery Manufacturers Contribute. The textile machinery people have played an important part in the industry's progress. New processing machinery for the weaving and knitting mills has improved products and lowered cost.

Determination, scientific ability, and vision on part of the rayon manufacturers—coupled with high grade service organizations working in the various textile fields, made the synthetic rayon industry a success. The fabric technicians also played a most important part in the development of markets.

Manufacturers of Synthetic Yarns and Fabrics. There are fifteen companies with twenty-eight plants producing synthetic yarns and fibers in the United States today. Sixteen of these plants are in the South and others in the North. The synthetic yarn and staple industry and its allied trades play an important part in the economic picture of our country. The industry employs more than 60,000 persons, and over 100,000 operators are employed in the various weaving and textile processing plants. The industry is well represented in the knitting field with over 40,000 employees. Also there are many thousands in the dyeing, finishing, converting and sales departments.

Both the viscose and acetate manufacturers produce filament yarn and staple fiber. The yarns are made in many different filament sizes. The staple is made in many lengths and fiber sizes. Bright and dull lusters are made in both filament and staple products. Chart No. 2 shows the filament rayon shipments by trades from the year 1930 to 1947.

Changes in the Rayon Textile Picture. During 1940 many changes were made in the rayon producing industry. The quality of rayon in general was improved, different type packages or put-up were introduced, and finer filaments became standard in many yarn sizes. Nylon entered the market on a large scale and received a welcome reception from the trade in general, especially the full-fashioned knitting division of the industry.

During this period yarn quality improved so as to permit higher speeds in the textile processing plants. Large size cones appeared, and creels were changed over to handle the larger package. The rayon standard cone has increased n size from a pound package to a three and four pound cone which allows less creeling and offers cheaper warping costs. Knots per pound were reduced at the same time.

By this time the cotton system of warping, with section beams, had been improved, and competed favorably with the silk system which previously was widely used. Speeds up to 950 yards per minute were practical for some numbers.

During this period several rayon manufacturers began to deliver their products on section beams prepared for the cotton system of warping. This type of package or put-up soon became popular, and the trend continued in this direction. This type put-up lowers the price of the rayon to the mill, and standard fabrics can be made much cheaper with a higher quality due to the less handling of the rayon filament yarn.

By this time the finer-filament yarns were well established in the trade. These fine filament yarns quickly found their place in the lines of fine quality fabrics, which have an unusual degree of softness and excellent drape, and which have increased breaking strengths.

The fine filaments, or multi-filament yarns, were found to have more covering power which allowed the fabric designers more latitude in their work.

The high strength viscose yarns were widely employed during this period. The yarns with low elongation were finding their place in tire cords, transmission belts, and other commercial industrial fields.

Staple Fibers. From 1940 onward the staple fiber field grew rapidly. Many cotton mills had changed over completely to synthetic fibers, and the fabrics found a ready market. The mills processing the staple fiber fabrics had to do very little changing of their machinery.

The largest outlet for the staple fiber products are the cotton mills.

These plants and their designers have shown a very progressive spirit in developing their lines. Today, very high quality fabrics are made at a very low cost that cannot be equalled by any other process.

No basic changes have been made in the plants processing staple fiber, and no doubt we shall see some radical developments as soon as the machinery companies have the time to work on new developments. Regular pickers, cards, drawing, fly frames, and spinning are processing these fibers.

Newest Equipment. One new process deserves serious thought. The Pacific Mills Company has developed a converter to cut, draft, and put into sliver form any blend of synthetic fibers in combination or combinations with the natural fibers. This process has a very definite future because it can handle three-inch staple lengths free of neps. The only thing that can hold back such a development is the rayon producers' price for their continuous tow.

The so-called single-strand breaker, using a smaller tow and then breaking and drafting it to the desired count, is being used to a limited extent. This type of finished yarn has a limited application due to the nature of the spun yarn. The yarns possess a high breaking strength and very low elongation. Excessive shrinkage occurs when the yarn is washed. The process too is not uniform from doff to doff, and this leads to filling bands and streaks.

Locations of the Rayon Weaving, Knitting, and Processing Plants. Chart No. 3, listing rayon shipments by territory, is interesting because it clearly indicates a trend. Note that the Piedmont section of the South, Virginia, West Virginia, North, and South Carolina, is the largest consumer of rayon filament yarns and staple fiber. The Piedmont section and the South section consume more than 55% of the total rayon and synthetic yarn made today. This percentage will be increased when the present construction program of the mills is completed.

The rayon industry, backed by scientific research, will continue to grow. The industry is in a healthy financial condition, and its employees are among the highest paid in the nation. In addition many new fibers will probably appear on the market during the next few years.

YEAR	KNIT GOODS: HOSIERY: FASH	KNIT GOODS: HOSIERY: SEAML	KNIT GOODS: OTHER: CIRC	KNIT GOODS: OTHER: WARP	WOVEN GOODS: BROAD	WOVEN GOODS: NAR	MISC USES	TOTAL EXCEPT TIRE	TIRE MFRS	TOTAL DOMESTIC	EXPORTS	TOTAL SHIPMENTS
TOTAL YARN												
1930	16.5		38.0		49.5	3.0	4.6	111.6	0	111.6	0.3	111.9
1931	21.1		48.6		75.6	4.0	6.2	155.5	0	155.5	0.3	155.8
1932	19.0		38.0		84.6	3.9	6.3	151.8	0	151.8	0.7	152.5
1933	17.0		41.3		141.3	5.5	5.8	210.9	0	210.9	1.1	212.0
1934	14.1		39.9		131.3	4.8	4.6	194.7	0	194.7	2.5	197.2
1935	14.7		47.9		179.5	5.2	5.4	252.7	0	252.7	2.2	254.9
1936	16.3		51.0		216.6	8.2	4.9	297.0	0.3	297.3	1.8	299.1
1937	12.6		38.9		201.6	7.4	4.8	265.3	0.9	266.2	1.1	267.3
1938	14.1		39.6		205.6	6.6	4.1	270.0	3.8	273.8	1.4	275.2
1939	16.2		49.9		269.8	9.1	5.8	350.8	8.8	359.6	1.9	361.5
1940	2.9	13.5	38.2	15.8	294.8	8.2	5.7	379.1	9.6	388.7	0.9	389.6
1941	9.4	16.9	37.5	20.4	331.0	10.2	8.8	434.2	18.2	452.4	1.3	453.7
1942	31.4	18.0	33.4	22.9	315.1	8.7	10.8	440.3	28.5	468.8	5.6	474.4
1943	33.1	16.1	29.8	26.3	304.8	10.4	18.1	438.6	55.6	494.2	9.5	503.7
1944	31.1	13.9	29.0	26.9	294.4	12.5	16.1	423.9	115.2	539.1	16.3	555.4
1945	23.3	12.1	28.5	28.6	295.8	14.1	12.6	415.0	187.4	602.4	20.0	622.4
1946	6.1	16.2	35.0	33.1	335.4	13.1	13.4	452.3	214.1	666.4	12.5	678.9
1947	1.6	16.8	35.6	37.0	380.6	12.7	17.2	501.5	227.5	729.0	16.8	745.8

Chart No. 2. Filament rayon yarn shipments by trades for the period 1930 to 1947. Units are millions of pounds.

Chart No. 3. Filament rayon yarn shipments by territory for the period 1940 to 1947. Units are millions of pounds.

	TOTAL EXC. TIRE MFRS. 1940	1941	1942	1943	1944	1945	1946	1947	TIRE MANUFACTURERS 1940	1941	1942	1943	1944	1945	1946	1947
NEW ENGLAND	110.7	124.9	118.2	116.5	107.1	98.8	105.7	115.3	2.7	4.7	5.4	6.1	5.7	6.7	11.0	7.6
METROPOLITAN	63.7	60.2	57.1	56.4	53.4	51.3	58.2	65.9								
PENN & OHIO	56.6	67.7	75.8	82.8	78.2	77.3	77.8	81.4	- -	- -	- -	2.6	21.6	56.1	63.0	69.8
MID-WEST	4.5	5.2	7.6	7.5	6.6	5.1	4.7	5.6								
PIEDMONT	139.6	168.6	171.3	166.4	168.8	174.0	195.8	222.4	3.3	7.8	11.5	23.9	48.5	75.4	77.8	88.8
SOUTH	4.0	7.4	10.3	9.0	9.8	8.5	10.1	10.9	3.6	5.7	11.6	23.0	39.4	49.2	62.3	61.3
TOTAL	379.1	434.2	440.3	438.6	423.9	415.0	452.3	501.5	9.6	18.2	28.5	55.6	115.2	187.4	214.1	227.5

Fewer Machines — Greater Output The Wool Industry

By EDWIN WILKINSON
National Association of Wool Manufacturers

In 28 years the industry lost 34,000 looms, but production increased; average employed remained same, but work week much shorter.

THE EDITOR'S request was that this article trace the modernization of the Wool Textile Industry over the past fifty years. It presented an interesting challenge, for whatever else may be said about it, this modernization was not spectacular or glamorous compared to developments in other fields. From the public viewpoint there have not been any developments to capture the imagination and inspire awe on the scale of the horseless carriage with its rapid succession of improvements, widely heralded to promote sales.

From the early 1900's on, everyone owning or considering the purchase of an automobile promptly learned of demountable tires, electric headlights, the self-starter, 100 horsepower—count 'em, 100—engines, balloon tires, and short-lived free-wheeling. And the pace of these breath-taking developments has not diminished. Dynamic, new contraptions which take the shift out of driving but put shiftlessness into us confront us daily. Perhaps the ultimate in automobiles will be achieved when they do our toast to that just right shade of brown.

What chance had the four-by-four automatic loom that would bang itself off if an end broke—and do it electrically. What chance I say, did this have against a contraption that would fly, actually leave the ground, with a man in it and in a short span of years, less than half a century, become the horribly wonderful thing we know today, spanning oceans and continents, jet-propelled, delivering atomic parcels of destruction unlimited.

Sure, the growing lad would ook upon the magazine fed loom running long periods without stop, changing shuttles in full flight, and he would probably confess, "That's neat!" But to him it was likely bush league stuff stacked against a comparatively inactive, slightly glowing tube which led to the elimination of the cat's whisker and crystal and started unending arguments as to the most effective hook-ups. Ma and Pa shed their Martian look, discarded the headset and joined in the common enjoyment of the loud-speaker. And now images come to us with sound coordinated.

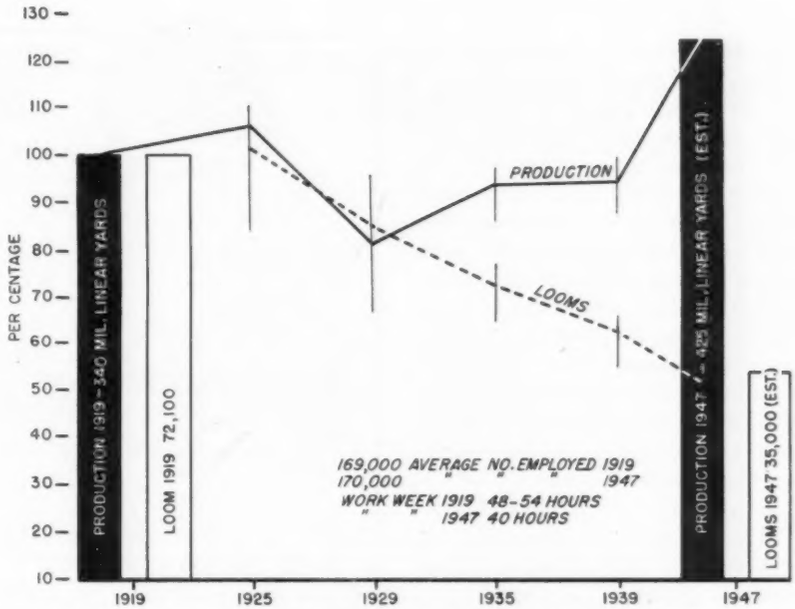
Against such a background it is a difficult task to report the progress of the wool textile industry—difficult and, I'm afraid, dull. But however dull, there has been definite progress. Much of it has resulted from the adaptation of developments in other fields—improved lighting through electricity —humidification control making fibers more amenable to the beating they take—water conditioning to make their baths more agreeable.

Advances in Lighting Increased Production. World War I brought home the realization of our increase in production potential through the adoption of multiple shift operation. Under the spur of necessity first and competition thereafter, it was found practicable as a result of improved lighting arrangements to better than double industry production. From there on in, it was largely a matter of machinery improvement and flow arrangements in plant layouts.

Fewer Looms—Greater Output. Higher speeds, larger packages, and accelerated chemical processes increased the production while the individual's work hours decreased and the number of production units decreased. The accompanying table clearly illustrates this point.

Seventy-two thousand looms in place in 1919 and nearly five million spindles produced nearly 3½ million yards of apparel fabric, but in 1947 about 4½ million yards were produced and the loomage had dropped to thirty-eight thousand and more than a million less spindles.

Scheduled work hours in 1919 were 48 and 50 hours a week, depending upon the area. In 1948, a 40-hour work week was standard. The number of employees for all practical purposes remained constant. No jet propulsion—nothing spectacular—but definite advance.



Graphic illustration showing how production of wool fabrics has increased while the number of looms has decreased.

Wartime Developments. As impressive as this advance is, there is good reason to believe it is only the beginning. Wartime development of new techniques is quickly being seized upon. Electronic controls; improved plant construction, heating and lighting; new machinery design; new methods, all combine to present a panorama of improvement that is exciting in its promise of greater output with reduced human input.

For example, to mention but a few of the recent outstanding developments in the textile machinery field, there is the so-called American system of spinning, the improved French worsted system, and the Sulzer loom. All these are commanding wide-spread attention, and their rate of installation in the industry seems to be limited only by their production.

American System of Spinning. As is well known, the American system of spinning has come out of the studies designed to improve the method of spinning yarns of rayon staple on the cotton system. As these developments progressed, the imagination of the developers was fired with the possibility of carrying the principles still further and to make them suitable for the production of yarns entirely of wool fiber, with such benefits as would accrue from the reduction in the number of processes and the increase in machinery assignments.

Robert J. McConnell, of the Whitin Machine Works, speaking before the American Association of Textile Technologists, stated that it was his opinion that there was no question but that satisfactory yarns can be made on this system at a lower cost than on the regular. He cited that the equipment built today for processing worsted fibers on this new system consist of:

1. Drawing arranged in three processes,
2. Super draft roving frame,
3. Improved long-draft spinning frame, for an aggregate of five processes from the top to yarn.

The length of fibers which can be processed on the American system is 56's to 64's top with a maximum length of 4 inches. These tops should contain 2 to 3 per cent oil. He summarized the ad-

Year	Production (Million Linear Yards) Apparel Fabric	Year End Machinery in Place Looms*	Spindles	Wage Earners Average Number Employed**	Scheduled Work Week
1919	340	72,100	4,800,000	169,000	48 & 54 hrs.
1925	351	72,700	5,200,000	167,000	48 & 54 hrs.
1929	277	63,900	4,900,000	149,000	48 & 54 hrs.
1935	319	52,500	4,300,000	167,000	40 hrs.
1939	321	45,300	3,900,000	158,000	40 hrs.
1947	425 (est.)	38,000 (est.)	3,500,000 (est.)	170,000	40 hrs.

* Includes narrow looms as ½ loom.

** Not strictly comparable year to year.

vantages and disadvantages as follows.

"The advantages are: The equipment would not require as large a financial outlay as for the regular equipment. From the standpoint of labor, there would be a considerable reduction. For example, comparing two layouts of four thousand spindles, one on regular system and one on American, there was a difference of ten operatives in favor of the American system. With an average wage of $1 an hour, this would mean a saving of $10 per spindle per year on a two shift basis.

"The roving frame and spinning frame with the double apron drafting system are superior to the machines used for the same purpose on regular systems from the standpoint of fiber control.

"The disadvantages are: The small number of doubles make a well-combed and even top an absolute necessity.

"The lack of flexibility, as only tops of certain length can be run.

"There are probably many more advantages and disadvantages, but those given are the most important."

Modified French System. With respect to the modified French system, those present at the Second Annual National Textile Seminar at Shawnee-on-Delaware in May of last year heard George F. Bliss of Atkinson, Hasserick and Company make some glowing predictions with regard to the French system of spinning. Mr. Bliss pointed out that until recently the standard French set consisted of approximately nine operations for up to 40's counts, and ten to eleven operations for higher counts.

Just prior to the war the bobbinier-intersection gillbox with patented lightweight fallers and rubbing aprons was developed for the fourth and fifth operations, eliminating operations No. 4, 5, 6 and 7. The modern French Set with this new equipment would line up as follows:

Three operations on intersectors. The fourth operation a coarse bobbinier-intersector. The fifth a fine bobbinier-intersector. The sixth a pre-finisher, and the seventh a finisher.

Mr. Bliss contended that with a modernized French draw set, plus high draft spinning frames, using a draft of fifteen, a manufacturer will not make only a better yarn but will make a yarn at as low cost as on any other system under the same local conditions. Furthermore, Mr. Bliss pointed out this equipment is so designed that no special combing or tops are required.

Swiss Loom. Perhaps the greatest departure from the conventional, however, is to be found in the Sulzer loom. It is noteworthy in that it eliminates the bobbin carrying shuttle, and it is attention commanding in that it incorporates to a very high degree high precision construction. Whether these looms in their present form are to be those that will gradually reach the industry in volume, or whether their nature will impose some limitation to their wide-spread adoption in the wool textile industry, there can be no question but that their design and engineering principles will have a profound effect upon the loom of tomorrow.

These examples are not the only developments in the textile field, but they are the ones which have probably commanded the greatest attention. New principles, new methods, new designs are being applied experimentally to all phases of textile processing with the view to either improving the process, accelerating, or eliminating it.

Modernization Essential. Because of the highly competitive nature of the business, it will be unfortunate indeed for those who do not keep abreast of the future developments and avail themselves of the opportunities for economical production, as may be proved, through their adoption.

WOOLEN AND WORSTED MACHINERY[1] IN THE UNITED STATES, DECEMBER 1947

Bureau of Census, Industry Division

Classification[1]	In place at end of December 1947 period[2]
Woolen and worsted looms[3]	38,572
Pile and jacquard	1,760
Broad	35,212
Automatic	28,703
Nonautomatic	6,509
Narrow (50" and under)	1,600
Carpet and rug looms	5,683
Broad (8/4 and up)	2,329
Narrow (6/4 and under)	3,354
Woolen spinning spindles	1,561,198
Woolen mills[6]	1,281,314
Knitting mills[7]	128,900
Carpet mills[8]	150,984
Worsted spinning spindles	1,920,542
Bradford	1,277,554
French	642,988
Worsted combs	2,656
Bradford	1,681
French	975

[1]Includes only power-driven machinery and excludes all machinery used exclusively for experimental or pattern making purposes.
[2]Machinery set up in operating position.
[3]Looms normally weaving fabrics containing by weight 25 per cent or more of yarns spun on the woolen and worsted systems.
[6]Mills producing weaving or knitting yarns for sale, or weaving yarns for own use.
[7]Mills producing knitting yarns for own use.
[8]Mills producing carpet yarn for sale or for own use.

In Retrospect

(Textile Industries, April '07)

Wages in English textile mills (per week of 55 hours). Oiler and belt "piercer," $6.00; waste man, $5.04; slubber tenders, $4.80; doffers $1.44; secondhand of carding, $7.20; combing overseers, $9.60.

Spinners $3.84; spinning overseers, $8.40. Bookkeepers $7.20; mill superintendents $12 to $65.00.

In Retrospect

(Textile Industries, March '07)

The Draper Co., Hopedale, Mass., are sending pocket dairies to all of the names on their "Cotton Chats" list. The company also has a surplus of their regular calendars— not the thermometer kind—those are very scarce, but will be pleased to send copies of the regular style to any cotton mill men as long as they last.

Industrial Relations

By DONALD COMER
Chairman of Board, Avondale Mills

IN THE beginning industrial relations at Avondale, I think, followed the same pattern—in the mill as on the farm; it was a neighborly pattern.

My father and his family left the plantation in Barbour County in 1886. Most of the people who came to work at Avondale Mills in 1897 came directly from the country, and I think both they and my father left for much the same reason. People just could not make a living growing cotton at current prices; and there could not be any diversity of farming because there was no nearby industrial purchasing population.

There are a few families in Avondale Mills today who came here in 1897. There are a great many more who often tell me of some pleasant personal relationship they had with my father. I think that he established one of the earliest kindergartens in a cotton mill community. My sisters, one or more at a time, were the first directors in this kindergarten. Today there are 9 of these and all wonderfully staffed.

Early Labor Problem—Broken Window Panes, Boy Scouting. Up until 1907, when I left our plantation in Barbour County to come with Avondale Mills, there had been no labor disputes—or so far as I know, any effort at labor organization. One of my first problems dealt with window panes in the mill. Boys with their sling shots kept them continually broken. One of my first activities was that of scout master to a village troup. There are fifty scout masters in Avondale communities today and one of the series of fifteen ads appearing monthly in *The Saturday Evening Post* deals with Avondale Boy Scouts. Today we have no window glass problem.

I am quite sure that cotton mill wages throughout the area were pretty much on the same low level, and yet these wages were accepted because there was a general knowledge that the company itself was not exploiting the situation and that they were an improvement on farm income.

History Will Show Failures. If the history of textiles in Alabama is ever written, the story will have to do with many failures. Some of the plants that are now operated by this company or by Cowikee Mills, were bought because of their financial troubles or after having passed through bankruptcy. Success or failure was a case of nip and tuck. But for the personal credit of my father, I suspect Avondale itself would not have survived.

I have spent many hours studying our cost sheets, searching for any evidence of unnecessary expense. It was not a matter of choice, but of necessity. Management, however, looked beyond this for every evidence of waste. It looked for every opportunity of improving quality and broadening merchandising horizons. Good industrial relations, of course, helped greatly here in every way.

I have told the story many times of how Avondale's first order for cloth was sold at 1 15/16c per yard. Obviously everybody in the business was in the same boat, and the waters were rough. This condition pretty well continued until the first World War. I believe many cotton mills had their first easy time during this war. Any record of that period would show that wages were increased promptly, and it must have been on the whole satisfactory because there was little record of industrial dispute.

War-time Wages Decreased. Following World War I and as a result of competition among some thousands of individual companies, part of the gains made in wages during war time were gradually lost. The industry as a whole attempted to maintain these wage gains; they attempted to improve the hour situation; but there were too many competing mills and

OUR request to Mr. Comer for this article came just as Avondale was completing its own 50th Anniversary. When the author mailed us his article he advised that "it is a little more personal and limited" than what the editors had in mind. The article is personal, and rightly so, for it reflects the Comer philosophy of industrial relations.—The Editors.

"Management must not only be concerned with the reward for capital investment, but must be concerned first with opportunity for decent living."

hours remained long and wages reached lower levels. During this period President Hoover through the Department of Commerce attempted some leadership in both matters, but the final report from that administration was that we would have to continue "to stew in our own juice."

Textiles Ready for NRA. When Franklin Roosevelt was elected and before his inauguration, I wrote him a letter suggesting some help from his administration for a Federal control of hours and the establishment of a minimum wage. The day NRA became a law our industry was there ready with Code No. 1. The gains established in this code were said to have been more than had been accomplished during the previous hundred years. The industry established a minimum wage, an eight-hour day, and did away with the last vestige of child labor.

"Paragraph 7-A." As a result of this there should have been an upsurge in industrial relations, but in NRA there was Paragraph 7-A, and we all know this was controversial. I think it was largely responsible for the nationwide textile strike in 1934. Although the strike failed, it left much bitter feeling.

When the Supreme Court declared NRA unconstitutional I was president of the American Cotton Manufacturers Association, and the main effort of my administration was to have our industry maintain and hold those gains that had come to us under NRA. Shortly afterwards we had the Wagner Act, which we think was one-sided, but even so there is evidence everywhere that industrial management and employees can work together under programs that promise better and better relations. I think the Taft-Hartley Act will be helpful in this direction.

Comer Philosophy. In a recent program in Birmingham, management-labor matters were up for discussion. We had our Congressman to represent the public; we had two labor leaders, and I was there to speak for management. I said then that while I was head of Avondale Mills and was at this meeting as representative of management, my first concern was for the best interest of those who worked under my direction. I felt I had a dual responsibility.

"My first concern is for the best interest of those who work under my direction."

"In the beginning industrial relations at Avondale followed a neighborly pattern."

"Every man who gives us a yard stick of success, other than dollars, is a boon to the race."

As time went on and the textile industry developed, as the boll weevil forced more and more people from the cotton farms into industry, shifts multiplied from one to two and sometimes three, and there was a general improvement in the wage structure; there were more and more labor organizations and we began to have unions. I continue to believe that any program to be good for one must be good for all and that certainly there should be some all time effort to prove that management as such must not only be concerned with the reward for capital investment, but must be concerned first with opportunity for decent living.

My father while Governor in 1907 said:

"In the last analysis, where the interests of the corporation and the masses clash and are at hazard, if the one or the other must take the risk of loss—statecraft, with unerring judgment decrees that it is less dangerous first to secure the interest of the people."

My father always held that to create worthwhile jobs was a great social service, and I never knew a more indefatigable worker toward that cause. Does any one doubt that more jobs are a stimulant to higher wages?

In this country there is published from time to time the highest salaries of certain people over the nation. As a rule those in the highest bracket are our movie stars. It has been said, though, that in business our highest paid men are the cheapest, and the main thing that people who work need and are entitled to have, is the very best management. Society still values such service in dollars with perhaps too much accent on the dollar, which leads me to say that every man who gives us a yard stick of success, other than dollars, is a boon to the race.

I once suggested a good many years ago that possibly the time might well come when people working in groups, which, of

"Management's concern is not to try to plumb the limits to which people may work without physical exhaustion, but the limit with which they may work with zeal and spirit and try to accomplish most."

course, would have to include management, might hire the money and supply themselves with the tools and so work for themselves. Of course, the present procedure is for money to get together and furnish the tools and hire the worker. I found that Owen D. Young had some years before that suggested the same thought in an address before the Business School at Harvard.

It must be obvious that there is a need of progress in this matter of fixing the reward as between invested capital and the people who tend the machines. Leaving it to periodical negotiations in some cases seems to work satisfactorily and in a spirit of good will, but too often the atmosphere is wrong, and even after agreements are reached it is only after both sides have said some hard things about each other.

Profit Sharing System. People work for more than money, and that has been said a thousand times. The money should be there, but there has got to be something else besides. In our company after each wage advance under our present profit sharing system, any company earnings that may come because of improving conditions immediately begin to divide themselves 50/50 between capital invested and the machine tender. There is no waiting for another period of negotiation. The system works automatically.

It is true that our program is still new. It has only been on trial now for nine years in one plant and seven years in all of the plants, and I don't hesitate to say that is not long enough for us to claim that we have something that is positive in its result. However, it is, I feel sure, an effort towards something better than the old way as we continue to work together in good will.

"There is a need of progress in this matter of fixing the reward as between invested capital and the people who tend the machines."

"There is evidence everywhere that industrial management and employees can work together under programs that promise better and better relations."

Management's concern is not to try to plumb the limits to which people may work without physical exhaustion, but the limit with which they may work with zeal and spirit and try to accomplish most. In industry people are entitled to at least a choice of two ways under which to work. This is the American way. Competition brings out the best in each and so progress develops.

Mr. Comer.

It seems to us at Avondale and Cowikee that the profit sharing so far as money reward is concerned is a partial answer to this philosophy. Management should continually strive for the most possible for the people who work under their direction.

There is a story I have heard of a cook who continued to dish out oatmeal that had lumps in it. The mistress of the house complained. The answer was, "Lord, Honey, don't you fuss; they eats it." That is not the answer. The problem is to get the lumps out.

The History. Those of us today who can look back fifty years in this industry can each see great changes in his own experience. The changes in the wage schedule, of course, are spectacular. Some young spinners and doffers fifty years ago worked twelve hours a day for 25c. The minimum wage today is 88c an hour.

As these wages changed, the tools changed. The investment in textile machinery per job is more than tripled. Instead of the simple staple fabrics we now weave some of the highest quality and style.

I can recall when there were two qualities of print cloth in this country, eastern and southern, and the southern always sold at a discount.

As the rayon business developed and the finest and sheerest fabrics came into our markets, they were largely from southern mills. Skills and precision of performance have developed right along, and these things came coupled with good industrial relations, not where people are "feudin', fussin', and fightin'."

In our mills today there continue to be good personal relations. The man who runs the mill pretty well knows just what the wages paid in that mill will buy in the way of necessities and comforts, and as higher skills develop, people will be ready to graduate into other industries which require still higher skills. And what is good for our section has to be good for the nation. We would not have it otherwise.

Yesteryear Experiences

Things Were Different Then

By J. C. EDWARDS
Former General Superintendent
(Retired)

Textile operating men of today may have their troubles. But read what went on in the mills at the turn of the century.

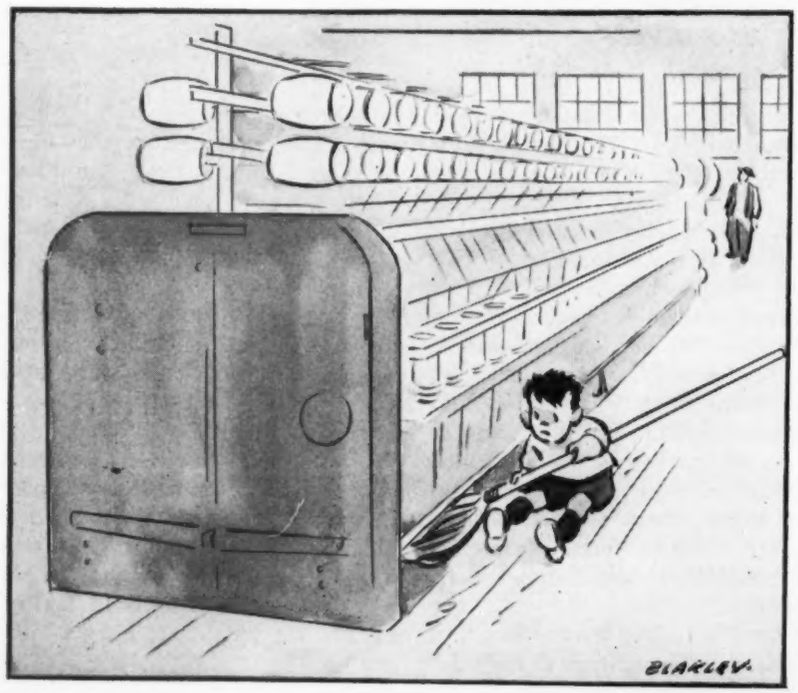
MY GOOD friend, the editor, has asked me to write an article for his 50th Anniversary edition, with particular emphasis upon my personal experiences and including some of the amusing and ridiculous, as well as the tragedies and pathos which have made my fifty-odd years in southern textiles a busy and interesting career.

This is not intended as an historical or technical review, but is more in the way of bringing home to the more youthful executive and personnel managers the fact that they do not, as they seem to think, have all the troubles in the world.

When visiting my younger friends who have attained executive and managerial positions, they almost always try to impress upon me that we older fellows never had any real problems, and while I don't mind lending them a shoulder to cry on, what they need most is a realization that there has never been a time when all of us did not have our problems galore, and that he who would get ahead has needed the wisdom of Solomon, the patience of Job, and a personality more pleasing than I have ever been able to attain—though its value is beyond measure.

It is true that the types of troubles have changed, but they were nonetheless trying then as now. In fact I claim that none of you of today has more of a problem than I was to my overseers of that day, and he had a mill full of others just as bad as I.

Child Labor. I could not have been more than eight when I started working in the old Oates Mill in Charlotte, N. C. Most present day managers have heard of child labor, but few of them ever knew it as it was in those days. The Oates Mill was the only mill in



Child labor was prevalent in those days. "My first job was cleaning rockers under twisters - - - - I slid along the floor with a waste mop cleaning the underpinning."

the vicinity of Charlotte when I started working. My first job was cleaning rockers under twisters, and my pay was ten cents per twelve and a half hour day. I slid along the floor with a waste mop cleaning the under-pinnings and cross arms, as well as the head ends of the machines; and since all the floors were of pine, I collected plenty of splinters in hands, feet, and rump.

This was before the advent of the Rabbeth type spindle, there being an open bearing on both the top and bottom spindle rail in those days. This resulted in a constant fog or spray of oil, but I didn't mind because I could absorb just so much before it started dripping off of me.

Supervising by Might. About the second day on the job another boy hit me in the eye with a bobbin which hurt so badly I forgot everything else in my determination to kill him. As he ran around a circular warper with me close in after him, the boss caught me and beat all the fight out of me with a leather strap, but from this incident I learned a lesson that stood me in good stead for many years—if you have got to fight, get in the first lick, the hardest, where it will count the most.

We kids counted that day lost when we didn't have at least one good fight to our credit, and the grown ups were about as bad. An overseer was pretty lucky if he failed to find some disgruntled fellow waiting to take him on at the door as he went out. These conditions prevailed on up to the early nineteen hundreds.

Cleanliness. About 1890 everybody in the Piedmont Section seemed to have decided to build a cotton mill, and they sprung up like mushrooms all the way from Greensboro, N. C., to Greenville, S. C., Charlotte being the hub of the industry. About this time Charlotte's second mill started operations, and I went over offering my valued services on a job picking up bobbins under the spoolers. There was not much choice since the pay was the same, as also was the filth. All the spooler hands as well as everybody else dipped snuff or chewed tobacco, spitting all over everything in reach, including the bobbins. There was no effort at sanitation of any kind, and body lice had a heyday and were no respector of persons.

This mill was quite advanced over the older ones, electric lights being the most advanced gadget. I was soon promoted to a broom handle which had to be cut off about mid-way up to conform to my height.

Shortly after this promotion my boss made me stay in after stopping time and sweep up. When I was finally released, I learned why. As I left the downstairs door, two big brothers whom I knew to be bad scrappers were waiting for him. As he left the door one of them hit him in the face, knocking him about fifteen feet before he hit the ground, then both of them were on him beating his head off. I could do nothing but watch the battle. After a few minutes, which seemed a year, I heard one of the brothers yell to the other one to get up because "he's cutting hell out of me." He yelled, but getting off the boss wasn't that easy, for when they tried to get up the boss kept gritting his teeth and using that knife on anything he could reach. Well, all three were sights for the cleaners when they stopped from complete exhaustion; all recovered and the boss was my hero for a day. He had to fire me a few days later, though for nearly killing a fellow with an iron weight. Dad finished me off with a *bunch* of sticks.

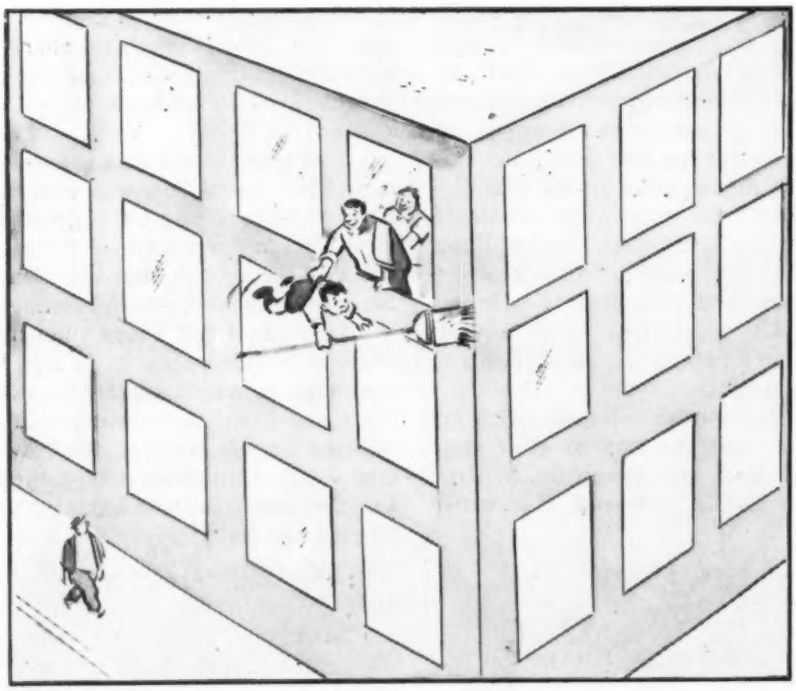
Promoted to sweeper.

I next went to work in the card room. My waste box was near a pair of slubbers, and I was greatly interested in the workings of these machines. I noticed that the slubber hand jammed a bobbin under the front steel roll every time he doffed his frames; one day I asked him what he was doing. He, knowing I was from the spinning room, told me he was winding the traverse. I didn't know for a long time that he was stealing hanks as he twirled the hank clock.

Stretch-Out. About this time some bright fellow started thinking about the stretch-out, which we hear so much about of recent years. Well, I was chosen as the guinea pig in this first experiment because I was destined many years later to be the superintendent of the first mill to completely install the modern time study system.

The revolving top flat card had not yet made its appearance—neither did we have coilers. Instead, the sliver was delivered from the card into a railway box or trough situated under the calender roll. The box was provided with a conveyor belt servicing eight to twelve cards. It was my job to care for the fronts of the cards, keeping the ends up; sweeping; cleaning out motes and fly, and doing anything I could to relieve the card stripper so he could take on twice as many cards as without me. The system worked out fine so they brought in more boys to further the venture.

Safety. I don't know why I escaped the tragedy that befell many of the other boys who undertook this work. There was a box about eight inches square under the licker-in, open at top and front. We had to rake the motes from these boxes, and a large number of the boys had their hands cut up like shredded wheat by catching in the licker-in. The remedy, of course, was to use a stick or brush, but since there was no such thing as collecting damages for injuries, the



"One of the pranks of the larger boys here was to take me by the waist band and hold me out the third story window just to hear me beg."

only one who cared was the victim —and for him it was too late.

There was a comic side, though, to this job, as with all others if you look for it. I explained that eight to twelve ends were delivered into the railway trough to a conveyor belt, which in turn delivered to a railway head very similar to the modern drawing frame, except that each head had an evener which compensated for an end down from any cause.

I soon learned that spitting in the railway trough or dropping in any kind of sticky substance would lap up the head and make life miserable for the boy who ran the heads. He was always larger than I, though, so I had to provide an alibi before I pulled the trick.

One of the pastimes of the larger boys here was to take me by the waist band and hold me out the third story window just to hear me beg.

Increase to Twenty Cents a Day. At this juncture, another mill, the Ada, started in Charlotte, so I went over one day and hit the boss for a job. I liked him from the start. He was a big fat fellow and looked down at me and asked me if I could make a living making bands at five cents a hundred. I said, yes sir. I started in next morning and, shortly after dinner, he came around and sized up my pile of bands; he counted them and found I had more than seven hundred.

"I can't let you make but five hundred a day," he said; but that was twenty-five cents, or fifteen cents more than I had been making, so I was happy with it, and beside that, I had lots of time to learn to doff. That was my goal now.

A few weeks later one of the doffers was fired or quit, and I saw the boss trying to doff. He was sweating and fuming but making poor headway. So I went up and asked him to let me doff that box; he looked me up and down and said, "Can you doff?"

I said, "Yes, sir," and he said, "Well, damn it, doff!" And I did it so well that I was all set. Our doff boxes were two hundred and fifty-pound affairs made of boiler plate and strip steel; I tipped the scales at maybe sixty. Given plenty of fare way, though, I could develop amazing speed with that box, and woe betide the man, beast, or machine in my path. The present-day tank had nothing on it as a demolition unit. I have accidentally hit my superintendent at high speed.

Pranks. Having attained my position as doffer, I had more time to practice my yen for playing pranks on the other boys. We had a rest period each round if we tried hard. Since I was now on the night shift we frequently slept these rest periods and played during the day. I not only amused myself playing tricks on the boys while they slept, but often interrupted production while the other help enjoyed the fun. One of my favorite tricks, which was always good for a laugh, was to blacken the hands of a sleeper, then tickle his nose and face with a straw. As the sleeper slapped at the invader he transferred the blacking from his hands to his face. The process was repeated till he was a real mess.

One night I pulled a side splitter. One of the boys went to sleep on a pile of burlap which was used to bale up the yarn; after applying the blacking process I got the thread and needle used for sewing up the bales; then I folded the burlap over the sleeper and completely sewed him up like a sack of meal. Then I started shouting fire. I almost got fired myself for this prank.

I mention these incidents as pointing out just some of the vicissitudes haunting those overseers and superintendents, that don't worry you younger fellows at all. They had plenty of other worries, though, as you shall see.

Labor Scarcity. Things were moving fast, and mills were starting weekly all through the Carolinas. Keeping in mind the fact that there were very few mills operating in this area, every one starting a new mill was put to it to get even a nucleus of experienced operatives to train the thousands of untrained help brought in mostly from the mountains and tenant farms. A man with three to half a dozen children was considered a find for any mill, and the

old man was easily convinced that there was a land of milk and honey waiting for him, and that all he had to do was come and get the children's pay on Saturday.

Thousands of these kind of families were moved to the mills, many of them taking practically nothing so that they had to be financed by the mill company, which in effect bound the operatives to the mills as if they were slaves; this condition led to a social and economic problem which was to foredoom most of these new mills.

Mills started raiding each other's villages at night, and while one superintendent was raiding a village several miles from his own mill, another mill would be busy moving some of his own help out. This condition was practiced till the early 1900's.

Even where both parents and mill managements co-operated in trying to balance accounts, there were many disillusionments and heartaches. Few fathers contributed anything to the family budget. The more industrious sometimes would carry the children's lunch to the mill. Some genius put this to words far better than I can when he wrote the song, "Everybody works but Father; he sits round all day; feet in front of the fire, smoking his pipe of clay. Mother takes in washing, so does sister Ann; everybody works at our house, but my old man."

Credit, No Money. Many families never received a cent for wages, merely getting a statement of account on pay day. This killed any incentive the operatives may have had to work, but the mill came back with the demand that they worked before they got any food. Credit with independent stores was, of course, out of the question, so many families were stuck in a hole they couldn't get out of.

One old fellow, though, saved his mules and an old mountain wagon. He also saved his sense of humor. One morning about daybreak he came through Charlotte with all his earthly belongings loaded in the wagon, and across the cotton canvas cover was scrawled this pertinent rhyme: "Fare the well McJonesville, I'll bid you all adieu. I may go to hell some day, but I'll never come back to you."

Speaking of moving, I was footloose and fancy free to go where I wished. No one seemed to care where I worked, just so I sweetened the kitty every Saturday, so I moved from Ada to Atherton to Alpha Mills in quick succession in Charlotte. Then the "big mill" at Pelzer, S. C., started, and as one of my bosses was there, I went down to work for him. Now maybe you think that wasn't a jaunt for me. Why anybody who had traveled out of his home county was a muchly traveled man, and here I was leaving the whole state. I was about ten then.

I, of course, got the job—head doffer at thirty-five cents a day; board and wash were one-sixty per week. Fifty cents left over, which I always sent back home, so I was still helping Charlotte along. I was fortunate in getting board with a good man and wife who had two grown boys of their own. We, with another grown man, occupied the upstairs room.

I was happy here for a few months. Every night I was privileged to sit with the family and read books and listen to the conversation of the older people. I felt that at last some one cared a little for me.

Head Doffer. Many of you younger fellows never had any experience with *head* doffers. Well, a good head doffer was worth a dozen presidents to an overseer, and a bad one would cause more labor trouble than all your labor racketeers. It was the head doffer's job to take four green prospects and teach them to doff, keep the frames running, different numbers separated, and generally relieve the section man of these troubles. He was the top sergeant and had to be tough.

I remember when I was head doffer I had to go to the section man about one of my boys who treated me with the utmost contempt. The section man told me to beat hell out of him. Now that particular boy was twice my weight, but all I needed was an assist from my section man, so I went back to the job and with a top clearer I knocked the boy down in the al-

Getting help in the old days. Until the early 1900's mills raided each other's villages at night, and while one superintendent was raiding a village several miles from his own mill, another mill would be busy moving some of his own help out.

ley; I knew if I didn't keep him down I was a "goner," so I was still laying it on when someone pulled me off. The section man asked me why I was beating that boy. I said, "You told me to!" And he said, "Don't tell anybody," and went his way. I had no further trouble with my boy.

With the responsibility of managing these doffers, there came over me an entire change in my demeanor and perspective towards life in general. If a stranger asked me where the overseer's office was, instead of sending him to the girls' toilet I gave him the correct answer; playing tricks was out the window with me, and I really tried to please my overseers and to merit their goodwill and confidence. I also applied myself to preparing myself for the job just ahead of me and to help out with anything where I could be of service.

So in due time I was promoted to an oiling job, where my pay was boosted to fifty cents per day. This job entailed one of the worst tasks I have ever had in all my experiences. I think this was the very first mill operated by electric power. We knew nothing of alternating current in those days, and a 75 hp motor was as big as the side of a house. It was my job to clean out two of these motors at noon each day, and the fact that they were hot as a stove made no difference to the damyankee who inspected them after me.

We had no compressed air, using only a hand bellows, a brush and small wire hook. Those motors had as many holes in them as a New Dealer has ideas, and we had to clean them all.

This was the first mill I ever saw with humidifiers, and was my face red when I reported to the boss that one of them was afire. Maybe here were the first Rabbeth type spindles, but I am not sure about this. I think they also had hardwood floors.

Section men had a closed corporation those days and would bust your head if they caught you trying to watch them fix a frame. I was lucky enough to save my section man from a nasty fall one day, and after that he showed me lots of tricks about a frame that paid off in later years.

It seems to me now that when I got onto an oiler's job I was destined to stay there for several years. I was too young to be trusted with a section man's job, so instead of changing jobs for more money and/or promotions, I changed more for experience or through a desire to be on the move. So for three or four years I changed from one mill to another; I finally landed a section in a mill in South Carolina. I later started saving what I could to put me through school for at least a few months, since I had had no regular schooling to that time.

At this point, I am wondering what part, if any, of the foregoing narrative has impressed you. And how does the fact that I cooked my own breakfast, put a piece of pancake and a half cup of molasses in a tin bucket and walked five miles to be on the job at six A.M. elicit a measure of pity for me and others in the same circumstances. When you read so much about the present-day youth problem and the misguided efforts of the politicians to combat it, do you wonder why such kids as I were not forced into prisons all over the country from the environments in which we lived?

Maybe we kids made better men by having been forced to meet and conquer the hardships of those days. Be that as it may, I have never heard of any of the boys I knew in my rounds ever getting into serious trouble of any kind. We didn't have any trouble with the plumber because we didn't have any plumbing. We didn't miss the pleasures of listening to a radio nor even a phonograph because we hadn't even heard of them. We did our own thinking because we didn't have the government propagandists to do our thinking for us. We didn't miss the refrigerators because we had nothing to put into them.

Getting back to the period where I was given charge of a section, I had, as it were, attained the status and responsibilities of a man. I was on my own to the extent that I had at last achieved that opportunity to prove to my superior that I had what it takes and that his confidence was well placed. First, I knew the help and was vain enough to think they liked and respected me, and I had sense enough to know that I had to have the respect and cooperation of the operatives to make a success of the job. Being put in charge of those few operatives also impressed me that, as their leader, I must, like Caesar's wife, be above suspicion and exemplary in conduct. I realized that here was a foundation upon which I was to build my future. A few years before I had coveted this job for the prestige which I longed for, but in the showdown I am glad that the responsibilities sobered and prepared me better to perform my duties honorably.

Well, you know something about us operatives in the old days; you know what the superintendents and overseers had to put up with; so don't take it too hard and feel that the world is against you nowadays if one of the humidifiers gets stopped up.

And don't lose your sense of humor.

In Retrospect

(Textile Industries, November '10)

The fact that motor trucks are more economical than horses under certain conditions has been discussed and proven in a previous article in this magazine.

It has been shown that horses can make from 15 to 20 miles per day, and in order to be economical the motor truck should be able to cover double that distance or else do the same mileage and carry double the loads.

With a gasoline truck, sufficient fuel can be carried for two or three days' service, and further gasoline may be procured at almost any village.

Cotton Is Still King

By ED LIPSCOMB
Director of Public Relations and Sales Promotions
National Cotton Council

Cotton occupies a more prominent place in the lives of Americans than any other fiber. Here's what is being done to keep it there.

THE AMERICAN cotton industry, representing fifteen million people, two and a half billion dollars of annual income, and seven and a half billion dollars of capital investment, parallels the food industry in playing a vital part in the lives of more people in this country and in the world than does any other single industry.

Textile Market. Cotton occupies a more prominent place in the lives of Americans today than any other fiber, and its versatility, lending itself to a myriad of uses, has captured for itself and is retaining approximately three-fourths of all American textile markets.

Varied and continuing attempts have been made to topple King Cotton from his throne, but because of the many characteristics and qualities which are cotton's alone, making it desirable for wearing apparel, household articles, and industrial applications, the King has held on to past markets and added many more as successful research has brought about new uses and improvements.

Mechanization. Cotton already has made great and successful progress in mechanization, and the industry is now conscious of the knowledge that this mechanization must spread throughout the Cotton Belt, replacing costly methods of growing and harvesting with more practical means.

The culture of cotton is rapidly undergoing the greatest mechanical revolution the industry has known since the days of Samuel Slater and his first mill in New England and Eli Whitney's first cotton gin. Hand cultivation and picking will continue in a diminishing scale for many years on farms, but the motor age is coming rapidly to the Cotton Belt. There have been many problems in mechanizing cotton cultivation and harvesting. There are still many kinks to be ironed out of some equipment which is already in use on mechanized farms.

From an economic standpoint, it is fortunate that the swing from hand cultivation and harvesting has not been an overnight revolution, but instead one that is taking place over the span of several years. As more and more farms are adopting mechanical equipment, displacing hand labor, industrial enterprises are expanding, and

new plants are mushrooming throughout the South. A large percentage of the labor displaced in the primary handling of cotton is being and will continue to be absorbed in this new industrial empire, bringing about a proper balance between agriculture and industry.

First in the modern parade of cotton growing are the tractor plow and tractor cultivator. One unit opens the soil, plants the cottonseed, and covers them again. When the seed are up, a mechanical cultivator plows out the weeds between cotton rows and simultaneously drops fertilizer. A unique new method of chopping cotton is the flame burner which destroys weeds with no harm to the cotton plant.

The last phase in which the machine can help the cotton farmer is the mechanical cotton picker which harvests cotton fifty times faster than a man can pick it by hand. There are several types of cotton pickers now being manufactured, designed for the various topographical conditions found in separate areas of the Cotton Belt.

Keeping pace with the mechanical age and to meet the requirements of machine-picked cotton, ginners have developed new equipment especially designed for cotton of this type. Installation is proceeding just as rapidly as manufacturers can make deliveries of equipment.

From the gin, we branch off into cottonseed and linters. The plastic field has greatly broadened demand for linters. Cottonseed oil, too, is in heavy demand today, but research is constantly trying to unlock further secrets known to exist inside the cottonseed.

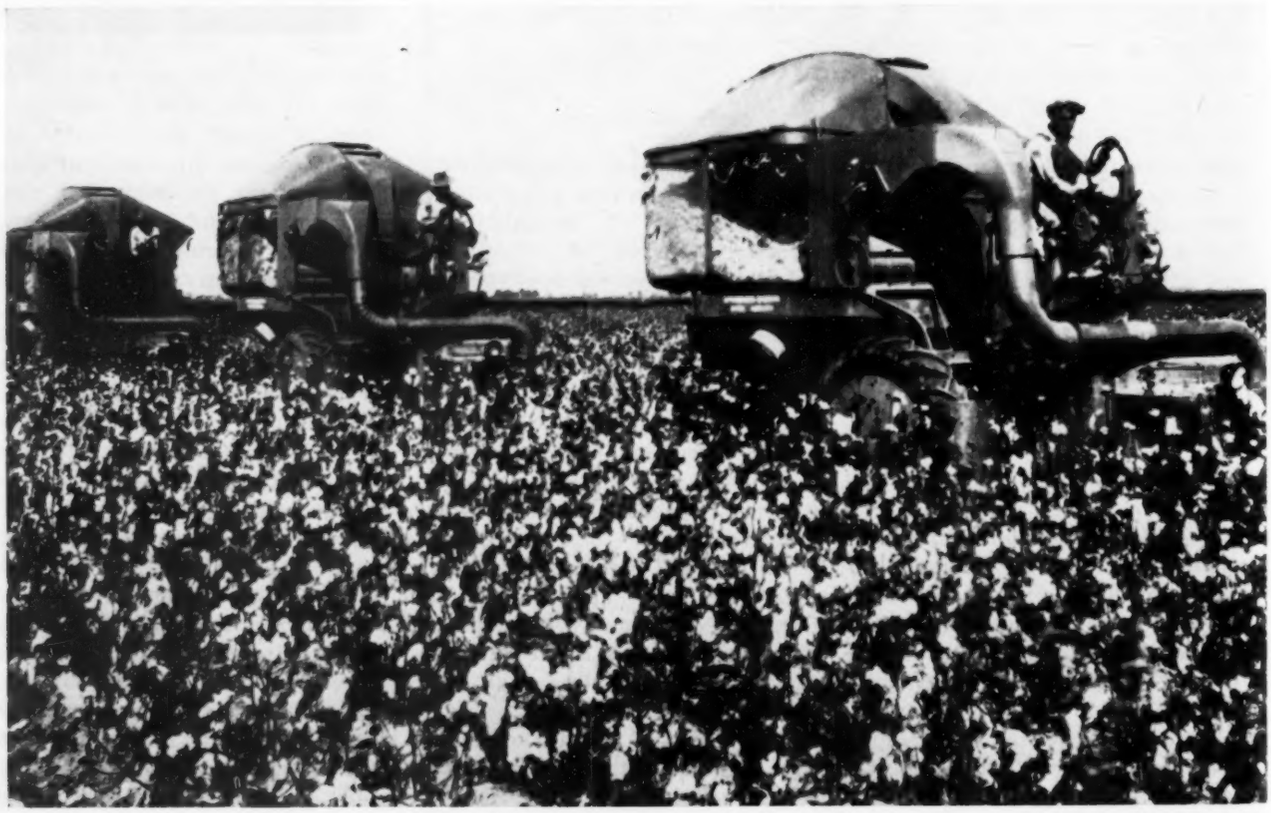
Cotton's Problems Being Solved. The cotton industry realizes and is fighting well and intelligently the three uppermost problems facing it today: (1) improvement of quality through research; (2) reduction of costs through increased efficiency, and (3) expansion of sales effort through promotion.

Through their own organization, the National Cotton Council of America, the cotton farmers, ginners, warehousemen, merchants, cotton spinners, and cottonseed crushers are conducting an integrated and powerful program of sales promotion, utilitzation research, production and marketing efficiency, and foreign trade development.

During the past decade, cotton's progress in the field of sales promotion and merchandising has been phenomenal. In markets varying from fashion to industrial products, cotton is enjoying the benefits of a coordinated promotion program.

Sales Promotion. Month after month, full-page Cotton Council fashion advertisements are appearing in consumer prestige publications such as *Vogue, Harper's Bazaar,* and *Mademoiselle.* The effectiveness of fashion promotion is proved by the fact that today cottons stand out as the foremost American fashion fabric. This is dynamically shown by a survey

Like elephants parading, this battery of mechanical cotton pickers marches across a field. One of these can gather cotton from 25 to 50 times as fast as a man can pick by hand. Machines of this type are this year going into production.



just completed by an unbiased federal agency which indicates that women show an overwhelming preference for cotton apparel.

The most glamorous and well-known of cotton's fashion campaigns is the annual Maid of Cotton project. Under the sponsorship of the Council, a fashion and goodwill ambassador is chosen from the Cotton Belt's most beautiful and brainy girls to represent cotton on a 35,000-mile, six-month tour of the United States and Europe. This year the Maid is Matilda Nail, of Texas.

Direct merchandising through fashion shows carried out by the Maid of Cotton is of major importance, but the most beneficial results of the Maid's tour are attained through national and international favorable publicity for cotton. It can be said without qualification that the cotton industry's Maid of Cotton promotion is the most widely publicized selling endeavor of its type in America.

Outside of the glamour picture, but of tremendous importance in number of bales of cotton consumed, are the great markets for underwear, men's shirts, house dresses, sturdy sportswear, and household cottons. To stimulate demand for cottons in the mass markets, the industry and the National Cotton Council have vigorously prosecuted a program to tell the story of the mental and physical uplift brought by frequent changes of fresh cotton apparel and home furnishings. Typical of promotions in this category was a car-card "Cotton Freshness" campaign conducted in 289 major markets last year which reached a circulation in excess of four and a half billion. This campaign is included with other promotional plans again this year.

Through various media, interest in employing used cotton bags in home sewing has gained great popularity throughout the nation and is now proving an economic factor in maintaining consumption of cotton bags by industrial users in the face of strong competition from other sources.

Cotton Insulation. An outstanding example of how promotion can create demand for a new product is the joint campaign conducted by the Council and the Cotton Insulation Association. In 1940, cotton insulation manufacturers used a total of 660 bales of cotton. At the end of 1947, annual consumption was running high in the tens of thousands of bales, and prospects are now logical that this industry may one day use as many as 500,000 bales of short staple, low grade cotton fiber. Demand has grown for flame-proofed cotton insulation to the extent that manufacturers have had to greatly expand their production facilities.

Cotton is active in many other promotion fields. A $67,500 margarine movie, nationwide publicity on cottonseed oil products, a retail store educational campaign, and countless other projects have an important place on the Council's 1948 program.

Research. As cotton has stepped up its sales program, it has accelerated its efforts to improve quality of lint and seed products and to develop new markets through research. There has been more progress in bringing about an equality in cotton research in the past two years than in the preceding decade. Under the Research and Marketing Act of 1946, cotton may look to federal research activity involving as much as $19,000,000 annually. The interest of federal and state agencies in cotton research has developed largely as a result of initiative taken by the research division of the Council.

The battle to lower production costs is one that is receiving the careful and aggressive attention of the National Cotton Council. Activity directed at lowering the cost of producing an acre of cotton and at reducing to a minimum the costs of processing and marketing are being undertaken on an increasing scale.

The annual mechanization conference, sponsored by the Council in cooperation with agriculture, government, and the farm equipment industry, is an example of work of this nature. Conferences on insect control, which will be continued, have as their ultimate goal the complete elimination of cotton insect damage which is so costly to the industry today.

Through a commonsense poster campaign carried out with ginners and warehouses, the 1946-47 season saw the frequency of cotton fires lowered by 20 per cent and the number of bales involved reduced from 90,894 to 26,400. An expanded similar program is planned for this year.

Foreign Markets. High on the industry's list of priorities is the re-development of cotton's overseas markets. Foreign markets which for the five-year period, 1934-38, accounted for an average annual sale of 5,860,000 bales of

LOOK BETTER ··· FEEL BETTER ··· WORK BETTER
START EVERY DAY
COTTON FRESH
FROM THE SKIN OUT
YOU'RE AT YOUR Best WHEN FRESH AND CLEAN

More than four and a half billion persons read this and similar car-cards in a nation-wide "Cotton Freshness" campaign during the past year. The project is being continued this year to promote the sale of cotton apparel.

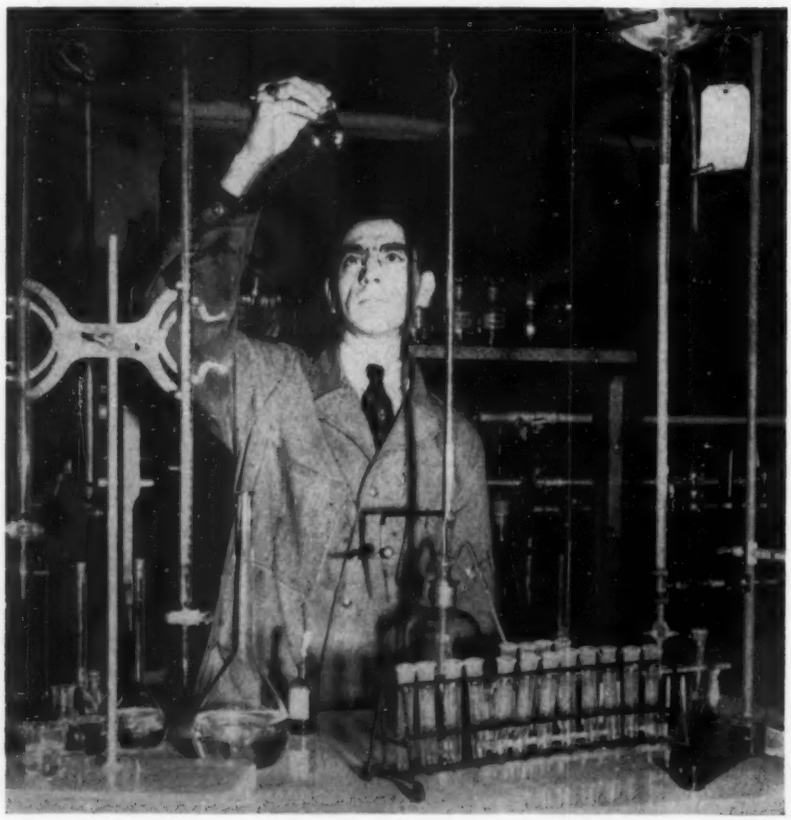
United States cotton, during the war dropped to a low of 1,111,000 bales in 1941. Through cooperative programs between the government and industry in 1947, overseas markets climbed to 3,539,170 bales in 1947.

Of vital interest to the trade and government in current activities, the Council's foreign trade division is now making personal surveys of the principal cotton consuming and producing countries, studying closely the economic factors which may affect cotton's markets during the years ahead.

Cotton and Plastics. Plastics have been developed which can be applied in a very thin film over cotton cloth to make the fabric stainproof, dustproof, and waterproof. Ink or other foreign matter can be quickly wiped from this material with a damp cloth. Cotton and plastics are being joined to make entirely new laminates which have a wide variety of uses. Cotton fabric is impregnated with plastic and molded under heat and pressure to make the very latest types of football helmets. The same material is used for producing motorboats, rowboats, and canoes which are extremely light in weight, strong and waterproof. Flat sheets of cotton and plastic, useful for instrument panels and machine parts, are stronger than steel and weigh less, yet they can be cut with a saw.

Non-Woven Fabrics. Cotton fabrics are now being made by several large American textile manufacturers without spinning or weaving. Thin carded webs of cotton fibers are held together with light applications of an invisible plastic, and the resulting product looks and feels like soft flannel and has scores of uses which are now being developed on a commercial basis.

Research is responsible for many of the vast gains in new uses and economy of cotton. Here a researcher tests the chemical quality of cotton cellulose which governs the quality of cotton itself.



Towels, draperies, napkins, tea bags, milk filters, polishing cloths, and casket linings are a few of the uses to which this new material has already been utilized.

Laboratories can have accidents, just like anyone else, and through such an event, the medical profession now has a valuable new cotton addition. A new cotton gauze was discovered which can be sewed up inside a wound. This special cotton gauze dissolves in the body without harm.

Cotton is used in immense quantities for packaging. Flour, stock feed, sugar, salt, fertilizer, vegetables, and many other products go to market in cotton bags, but research is continuing to retain and broaden this important market in view of strong competition from other materials. Research is now developing better cotton bags, insect and rodent-resistant and proofed against mildew and rot.

After the widely publicized disastrous circus fire, it was the cotton industry which found a way to make canvas absolutely flameproof. In this connection, three simple methods of flameproofing cotton mattresses have been publicized by the National Cotton Council, and this information has been made available to those fields most directly interested.

Science has been applied to cotton clothes, too. There are now cotton fabrics so treated that they have a permanent starchy finish that will not wash out, cottons that are crease-resistant and water-repellent.

Many will remember the day when cottons were considered as only practical for "every-day" use. Today, the development of fine cotton textiles is such that they are in heavy demand by the leading fashion designers.

Garment manufacturers say they prefer to manufacture cotton apparel over those of other materials because cotton takes cutting and sewing better, and does not necessitate special cleaning instructions on the tags.

The large gains of cotton in this field will continue and grow as new advances are made in research and promotion throughout all phases of cotton culture and manufacture.

50 Years of Textile Progress in

Mill Construction and Layout

By A. D. ASBURY
Partner, J. E. Sirrine Co.

Water power once determined site of mill. Present-day design and machinery layout differ radically from those of yesteryear.

THE WORLD-WIDE history of industrial development includes a few phenomenal industries that were conceived and grew to mature stature within a comparatively short period of time. Most of the major industries, however, have been evolved through long, tedious growth, and the textile industry belongs in this category of patient continual development.

The textile industry has often been criticized as being backward because it has not shown the startling progress that some of the newer industries have exhibited during recent years. These critics probably overlook the fact that the industry started several thousand years ahead of the machine age, with artisans working in their own homes.

Early Textiles. The first textile workers manipulated the fibers by hand and later built simple hand tools for their own use. In later ages, simple machines were made to increase the production of the manual workers, and in still later ages the artisans moved into factories when better, though still crude, machines were invented.

During this early period of development there were no machine shops, and the machines for each mill were built at that plant in accordance with the ideas of the individual machine builder. This gradual development over hundreds of years, however, evolved principles of processing fibers that have endured through the modern machine age.

In comparing industries, we must not forget that the textile industry is inherently different from others in that it deals primarily with a raw material that consists of many small fibers that have little adhesive attraction for each other. These fibers must be cleaned, sorted, straightened out, and finally twisted together to form yarn or threads which can be woven or knitted into fabrics.

Other industrial products might start with a basic frame at one end of a production line and have individual parts, or assembly of parts, added to it as it progresses down the assembly line to its final completion at the delivery end of the line. The textile product, on the other hand, actually passes through many successive machines, changing its shape, size, and characteristics with each process.

Each individual machine takes the finished product of the preceding machine as its raw material and, in reality, converts it into a new product. The productive capacities of the individual machines vary to such an extent that it has not been practical to combine the processes into a single operation, and the product is removed from one machine to be transported to and fed through the succeeding machine.

Progress and Earnings. Though the general principles of textile manufacturing have been inherited from the past ages, improvements and refinements in methods of processing the fibers have been made relentlessly. Modern, high speed, large package machines have replaced most of the manual operations, and the textile operatives of today are really machine operators instead of manual workers. Every important change in machinery or methods has increased the productive capacity of the individual worker, and this increased productivity is the only basis for increased earnings.

No modern country could possibly supply its own demand for textile products with the crude implements and tools of a century ago. The industry has achieved its present prominence only through progress in equipment and increased production of the individual employee.

Years ago Arlington Mills used the then modern White truck to transport stock in process. Note two-wheeler animal drawn cart at extreme left.

During the past 50 years, there have been many great changes in the textile industry which grew from eighteen million spindles to a peak of thirty-eight million spindles, and then declined to the present twenty-three million spindles in the United States. The changes in construction and layout have been equally startling, but these changes have been gradual and accumulative. They are often forgotten until a comparison is made between typical mills of two periods to focus attention on the differences in design, construction, materials, layout, and equipment.

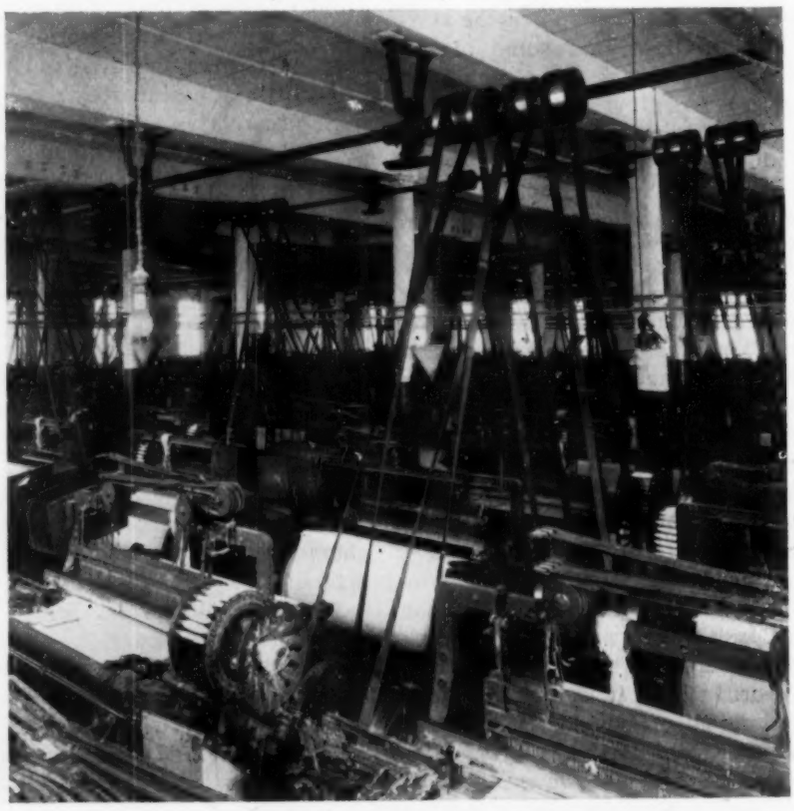
These mill changes were the logical results of concurrent changes and developments during the period, including the development of commercial utilities; the development of different building materials; changed conditions during and resulting from two world wars; improved earth moving equipment; improved electrical equipment; new textile machines and auxiliary equipment.

Power Dictated Site. Prior to the turn of the century, many mills were driven by water turbines with mechanical power distribution including rope drives, large belts, and shafting. The best power site was often the poorest building site, but the availability of power often dictated that the mill should be located in the deep narrow valley. The steep terrain restricted the width of the mill and forced the erection of a long, narrow building three or four stories high. Often the adjacent hill provided a direct outside entrance to each floor, and in some instances the workers entered a stair tower extending above the mill roof and walked down to the different floors.

Early Construction. The site was often inaccessible to railroad sidings, and native materials were frequently used for the buildings, including rough rock foundations, and wooden beams and columns. Massive brick walls were normally used to support the multi-story structure and to dampen the vibration of the machinery.

The limited strength of the wooden columns and beams led to the adoption of 8-foot bays and 24-foot or 25-foot divisions. In these early mills there was a comparatively large column for each 200 square feet of floor space, and operations and layout were often handicapped by the narrow column spacings. The load on the side walls kept the brick piers comparatively wide and forced the use of relatively narrow windows.

Natural light was restricted by the high hills, narrow windows, the profusion of columns and belts and, as a result, the inside area



Overhead belt-driven weave room from the files of "Textile Industries." Drop cord exposed incandescent lamps and loom batteries help date this picture. Shipper handles on looms are covered with cloth. Note surplus wire on drop cord shown at right.

was rather dark and gloomy.

The warehouses and auxiliary buildings were often located on the hillside on different levels from the manufacturing floors, with the handling of materials being complicated by these vertical differences in floor levels. There was little humidification equipment available, and the earlier mills were somewhat dependent on the natural humidity of the river valley.

Machinery. Many of the early mills were equipped with non-automatic looms, but the progressive mills built around 1898 and 1900 were ahead of their competitors in installing automatic looms, which had been introduced only four years before, in 1894. This was a very light loom with simple mechanisms which were gradually improved during the following years. This was the beginning of the famous E-Model Draper loom which was to remain the standard loom for staple fabrics for the next 30 years.

These early mills were also equipped with old style spoolers and warpers, and all knots were tied by hand, since the automatic knotter was first introduced in 1900. The first universal winder was introduced in 1891, but comparatively few were in use before the turn of the century. That first winder is now located in the Smithsonian Institute in Washington. All warps were drawn-in by hand because the automatic tying-in machine was not introduced until 1904.

The mills had practically no opening or blending equipment; three successive pickers; two or three drawing processes; three or four roving processes; no long draft equipment; no tape driven spindles; and no shearing machines. There were no motor drives and very few electric lights. The mills ran only one shift, but ran sixty or more hours per week.

Power and Drives. A few installations of electric power generation, distribution, and motor drives were made between 1894 and 1898, but the greatest impetus to the use of electric power started about 1905. This was largely due to the aggressive efforts of the expanding utility companies and the commercial acceptance of the steam turbo-generator. These two sources of power offered a free form of competition that resulted in rapid development.

Belt-driven weave room with drop cord lights and reflectors. This photo, from the files of "Textile Industries," is not dated. Note style of the day as depicted by weaver in foreground.

The earliest drives generally combined the use of large group motors and line shafting. At least one installation of individual motor drive on spinning frames was in use in 1903. The four-frame drive for spinning was probably first used about that year.

Standardization in the early days was far from a reality. Two-phase, as well as three-phase, 25, 40, 60, 66 cycles and power voltages of 220, 440, 550, 1040, and 2080 were in common use.

A considerable number of individual motors were installed on spinning and twister frames between 1906 and 1912. Some individual loom motors had been in operation prior to 1911, but they were considered too costly for use on cotton looms. The use of individual motors for spinning, twisting, and looms was rapidly accelerated by the building of new mills and the replacement of machinery in old mills during the five years just prior to our entrance into the first world war. Through the years, the cost of purchased power has decreased, in spite of the rising trend of other costs, and the quality of service has been materially improved.

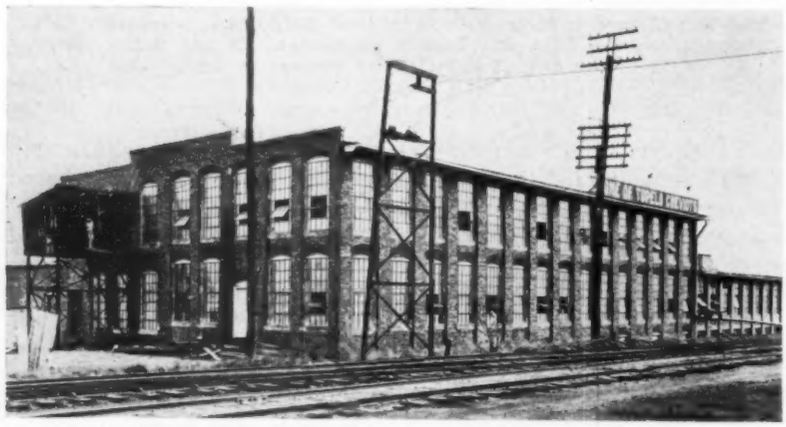
Lighting. In the early days of the use of electricity in textile mills, direct current arc lamps were used for lighting. The units were widely spaced, the intensity was low, the glare was bad, and there was no uniformity.

During the 1900-1910 period, many mills were lighted with enclosed multiple arc lamps and small bare incandescent lamps. These were also widely spaced and entirely inadequate by modern standards. Small systems usually used lower voltage, with less personal hazard, and the multiple system of wiring lent itself to better grouping of outlets and simpler controls.

The next improvement was the introduction of reflecting equipment to capture a part of the upward light and re-direct it to the plane of work. The first reflectors were small in size and cheaply constructed. The demand for better lighting led to the introduction of more efficient and higher watt-

age lamps, better reflecting equipment in porcelain enameled steel, and in improved shapes for directing and controlling the light. Higher intensities were used and diffusing means were added to provide, in effect, larger light sources to reduce the glare and to diffuse the light more evenly.

1900-1910 Mill. Just about the end of the nineteenth century and during the first decade of the new century, many textile mills were built in the South with steam engines as the source of power. The general construction was the same as for the earlier mills, but the site was materially improved.



The old Tupelo (Miss.) Mills. Another undated picture, except for the "Caporal" cigarette advertisement shown at left. Smith Publishing Company's oldest employee advises that these "fags" were sold when he was a child.

These mills were located on higher ground, close to the railroads, and on comparatively level sites.

The usual mill was still three or four story with rope drive or big belt drive from the engine to shafting in each floor. The load bearing walls were still heavy masonry construction but, during this period, the use of heavier floor plank, beams, and columns permitted spacing the columns 9′, 10′, 10′-8″, or even 11′ apart. This increase in the width of the bays permitted the use of wider windows between the brick piers and materially reduced the number of interior columns. This resulted in a brighter interior and improved operating conditions. The change in location of the mills to higher ground materially reduced the problem of handling materials to and from the plant, but did not affect the vertical handling within the plant.

Some of the yarn mills and small weaving mills of this period were single story, with the same general construction as with the multi-story plants. The single story was a result of the size of the plant rather than a change in design. In these plants the machinery was normally arranged so that the raw material entered one end of the building and the finished product was shipped from the other end of the building.

Prior to the first world war, the textile mills normally operated only one shift and were primarily designed for daylight operation. They were usually 100′ to 125′ wide to permit penetration of natural light from the side windows to the center of the building. A few plants were built 150′ wide but, in these cases, the story height was normally increased for taller windows so the natural light could penetrate to the center of the wider building. Most of these mills were also designed with a monitor over the roof to admit light through the roof. The spinning room was usually located in the top floor to secure the most light possible for this department.

First World War Mills. The abnormal demand for textile products for the first world war led to the erection of many new mills and to the general operation of two shifts in all mills. This two-shift operation accentuated the need of better lighting for the mills and stimulated progress in the development of lighting units.

The mills of the 1898-1918 period were usually 4-story. Figure 1 shows the usual layout. The cotton was blown to the third floor, and the roving was carried up an elevator to the spinning room in the top floor. The filling yarn and section beams were carried down the elevators. Half of the loom beams and finished cloth were carried down to the first floor. Literally scores of textile mills were built along this general line, which was the best design of that time. The carding and spinning departments used one floor each, while the weaving used two complete floors. Two elevators were usually installed to handle the vertical transportation, which was normally 2½ to 3 times the product of the mill. Many mills of this general design are now installing new machinery and auxiliary equipment to keep the plants as modern as possible.

With the common acceptance of motor drive and cast iron or steel columns and steel framing, some of the construction limitations were removed and many of the new mills were designed to use wide steel sash. Some of these new buildings were one story with thin curtain walls up to the window sills and continuous steel sash from sill height to ceiling.

The roof beams were supported by small metal columns, with only a narrow plate across the column between the wide steel sash. These single story, glass wall buildings were often designed with two or three monitors or "sawteeth" over the roofs. Multiple story buildings were of similar construction, except that a narrow masonry or concrete pier was used between the steel sash. This "daylight construction" admitted the maximum natural light and was very popular for a short time during the '20s.

The demand for daylight walls led to a few curious angular win-

dow arrangements in an effort to increase the amount of light through the side walls. Only two or three experimental plants were erected, and the results did not justify the radical design, which was never adopted by any of the prominent engineers.

Within a comparatively few years the disadvantages of the daylight construction became apparent. The wide expanse of windows admitted maximum natural light, but the glare from the sun was objectionable early in the mornings and late afternoons. Many mills installed cloth curtains that could be drawn; however, high humidity and mildew soon proved that these were not desirable. The next attempt to kill the sun's glare was the use of thin, lightcolored water soluble paint on the inside of the glass; this led to the introduction of special colored glass to reduce the glare.

The glass walls provided little insulation. The heat loss in the winter and the transmission of sun heat in the summer increased the load on the heating and humidifier systems, materially reducing their effectiveness. During the winter months the high humidity within the mills created a very difficult problem of condensation on the cold side walls, roofs, and steel sash. These difficulties led to the use of wood preservative treatments for roof plank and other wooden members subjected to moist conditions, thorough roof insulation, and condensation gutters in the window sills to catch the condensation from the sash.

Peak Spindleage and Liquidation. In 1925 the United States' textile industry reached its peak size of 38 million spindles, but the demand for cloth would no longer justify all mills running two shifts. For the first time, the industry had surplus and idle spindles, and within a short time some mills began to liquidate. During the following 13 years the size of the industry decreased by about one million spindles per year. This period saw comparatively little new mill construction that might permit changes in design or materials. There was considerable replacement of equipment and some extensions that simply matched the old design of the existing building.

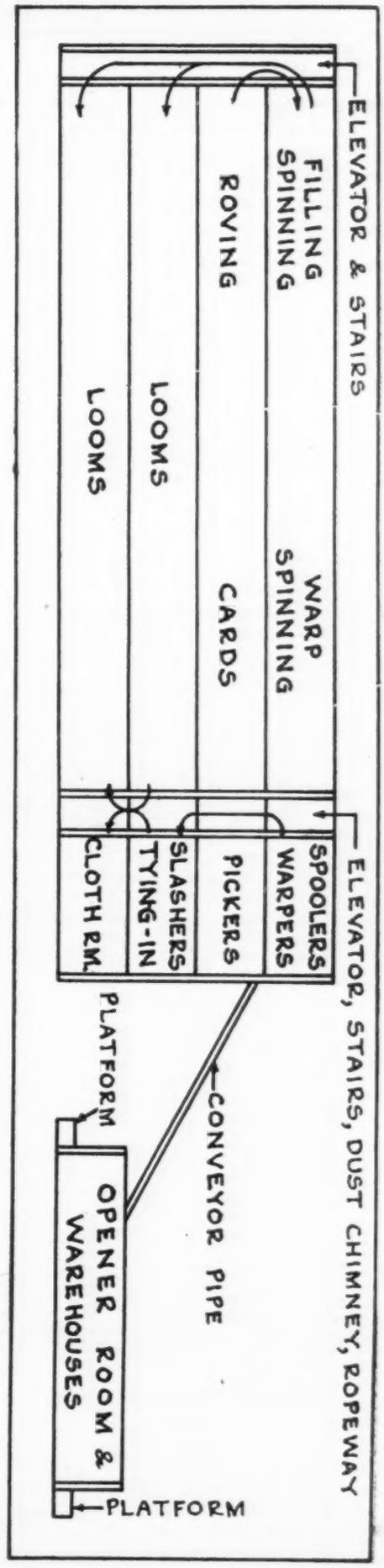


Fig. 1 (at right). Sectional elevation of a typical multi-story mill of the 1898-1918 period.

Fluorescent Lights; Air Conditioning. Just prior to the second world war there were two new developments in auxiliary equipment that were destined to have a terrific impact on the design of textile mills. The fluorescent lamp became commercially available in 1938, providing, for the first time, a highly efficient, large area, low brightness light source. With the new fixtures that were soon available, the mills could secure uniform coverage, high intensity light without glare. The mills were no longer dependent on natural light since the new lamps would provide and maintain uniform lighting all over the room, regardless of outside conditions.

About the same time, modern systems of air conditioning, combined with heating and humidification, were introduced. Comparatively few mill installations were made prior to or during the war, but many hundreds of installations were made in buildings used for war purposes, and the mass production required for these projects developed a capacity that resulted in lower costs and many installations just after the war.

With these two auxiliaries, the architects and engineers were no longer restricted to narrow buildings for light and ventilation, but were free to design mills any shape or size that was desirable from an economic viewpoint.

Other Factors Affecting Design. Other changes in the same general period not only removed restrictions, but demanded a change in the general design of mills. A few years before, long draft systems for roving and spinning frames had been introduced and were accepted as standard equipment for the modern mills. The use of the long draft systems eliminated one or two roving processes

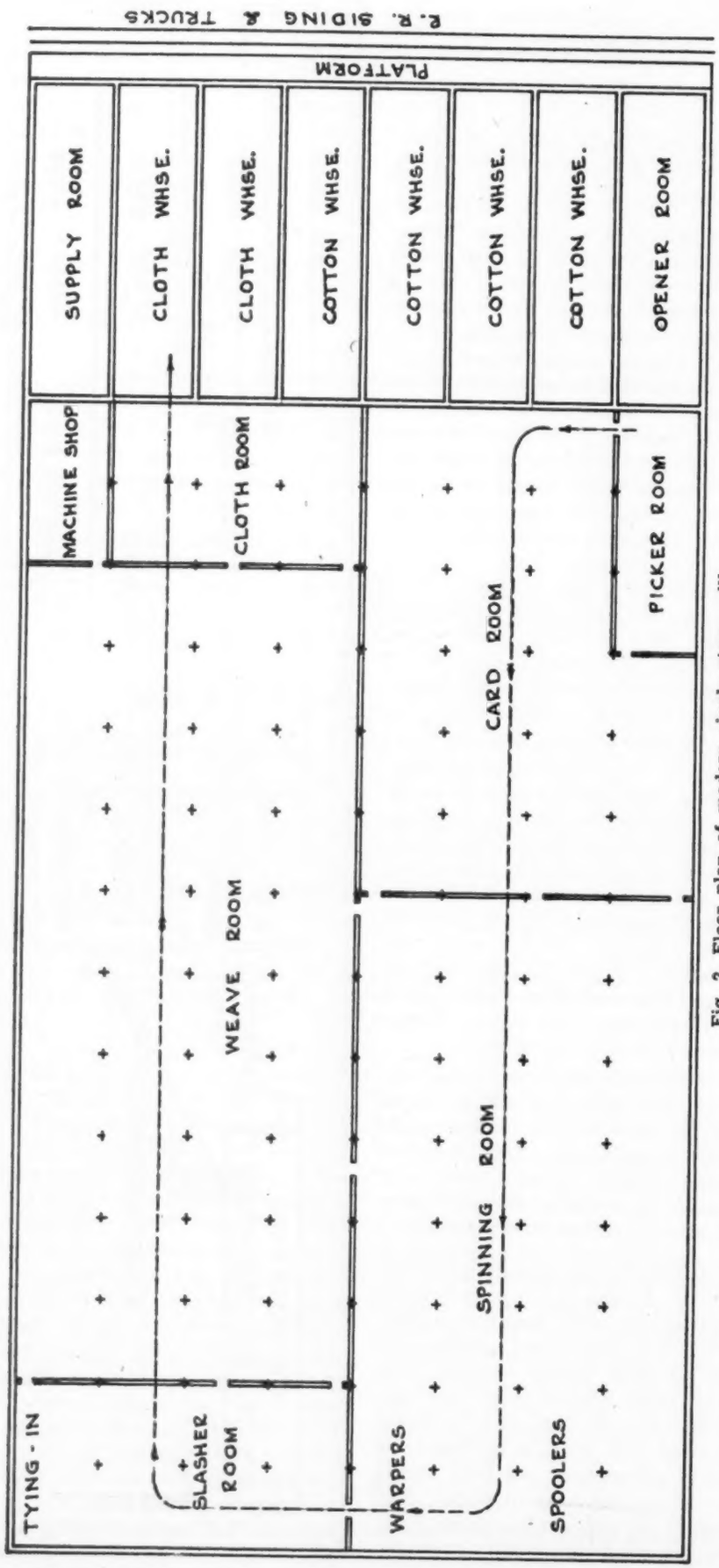


Fig. 2. Floor plan of modern single story mill.

and reduced the amount of floor space needed in the card room.

At the same time the trend in spinning was to wider gauge frames that would produce larger bobbins, so additional floor space was needed for the new spinning equipment, regardless of its higher speed and higher production.

The older looms were normally equipped with 16″ and 18″ diameter beams, but the new high speed looms of the late 20s and 30s were usually equipped with 20″, 22″, or 26″ diameter beams. The looms were deeper and needed wider alleys for the installation of the larger beams. Additional floor space, with wider column spacing, was now needed for new looms; these changes in textile machinery upset the old balance of 25% of total floor space for card room and spinning room, and 50% for weave rooms. The old areas that had fit so neatly over one another no longer balanced, so a change in layout was necessary.

Another factor that suggested a radical change in textile mill design was a rapid development in an entirely different industry—the earth moving and grading equipment. With this new road-working and runway building machinery, enormous quantities of dirt could be moved quickly and cheaply, and the door was open to large level sites that would be suitable for any size or shaped building.

One-Story Mills. These changes in conditions and equipment promoted the development of the modern one-story mill that is practically square. Figure 2 is a diagram of a typical plant with the layout arranged so that the product travels through the plant like a huge "U." The trip through the plant starts and stops in the warehouse, where one sidetrack, one shipping clerk, and one yard crew can handle and control everything going into or out of the plant.

The flow of the product is away from the raw material storage on one side of the plant and back to finished goods storage on the other side of the plant, without any unnecessary handling between processes. This layout is admirable for future extensions since floor space and equipment can be added

to all departments with practically no rearrangement of existing facilities.

The new high speed looms require wider column spacing and steadier supports than were needed in former years; both requirements are met with the one-story layout. With a single story building, the columns support only the roof and can be widely spaced. Designs are not uncommon with 1000 to 1200 square feet of floor area to each column. The modern plant will have only one fifth as many columns as the best designed plant of fifty years ago. The steel framing is either bolted or riveted to provide maximum rigidity.

The side wall construction might vary to suit different requirements and must be carefully checked to secure maximum benefits at the lowest cost. Normally the interior side of the wall would be faced with glazed structural tile to reduce maintenance and repainting. Some experimental work has been done on fairly large panels that could be quickly and easily installed in the steel frame, but the future alone can tell what developments might result along this line.

The modern mill is completely air conditioned, with the system being designed to produce best results for the individual plant. Automatic controls regulate and maintain pre-determined conditions within fairly close limits to suit operations in each room.

New textile machines have kept step with the progress in construction and layout. Many machines have been completely redesigned and entirely new machines have been introduced. The 50 year period has seen the introduction of practically all of the modern opening and cleaning equipment; the development of the one process pickers; the introduction of lap winders and controlled draft drawing; the introduction and widespread use of long draft systems; the development of ball bearing spindles, tape drive, traversing ring rails; the introduction of the tying-in machine, automatic spooler and super speed warper; the introduction of traveling spindle winders and automatic quilling machines; the introduction of high speed looms for cottons, woolens, silks, and synthetic fabrics; the use of continuous ranges in the cloth rooms, with high speed shearing machines.

The entire development and use of synthetic fibers for textile fabrics has been within this fifty year period. The development of completely new machines for processing these fibers has been remarkable and includes many different types of winders, twisters, and looms.

The first full-fashioned hosiery machine was built in the United States at the beginning of this fifty year period, and the phenomenal growth of the full-fashioned hosiery industry has been entirely within this period. This period has also witnessed the introduction of the tricot, or flat-knitting, machine and the rapid development of this form of textiles.

The finishing and dyeing processes have kept step with the progress of other branches of the industry in the development of new dyes and finishes and the modernization of their plants through the introduction of new machines and continuous ranges.

With the common use of large packages, material handling equipment is being installed in many plants. Various types of equipment are available and must be carefully selected to secure the maximum benefits. The installation of material handling equipment must be carefully coordinated with the installation of the machinery, air conditioning, and other auxiliary equipment to avoid interferences.

Most modern mills are also equipped with some type of automatic cleaning systems to replace or supplement the old manual cleaning program.

Another development of recent years is the emphasis that is placed on working conditions and provisions for the workers' health and comfort. Many of the modern mills are providing first aid rooms, lunch rooms, cafeterias, locker rooms, smoking rooms, and paved automobile parking areas.

A careful analysis of the past fifty years in the textile industry reveals remarkable progress during that period, and if the future is based on the past, there is every prospect of continued progress in the years ahead.

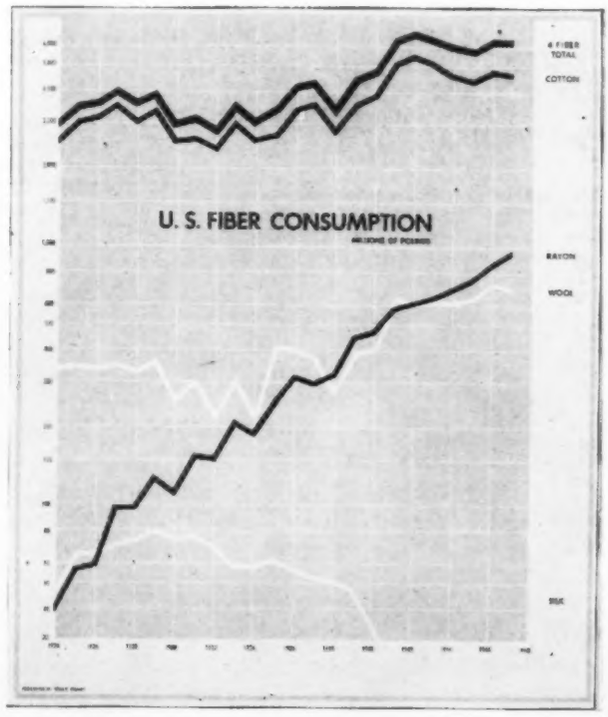


Chart showing the quantity of the four principal fibers consumed by mills in the United States during the period 1924-1947. Units are millions of pounds.

Courtesy, "Rayon Organon."

Humidification and Air Conditioning

By ROBERT S. PARKS
Chairman, Parks-Cramer Co.

From vapor pots and floor sprinkling to the modern humidifying, air conditioning, and refrigeration units. Textiles led the way.

THE TEXTILE industry can be proud of air conditioning. It named it, helped it through kindergarten, grade school, and higher institutions of learning, and is now helping it to qualify for a Ph. D.

History. Fifty years ago there was no such thing as air conditioning; very little humidification, unless sprinkling the floors or the use of steam vapor pots satisfies the name. Certain areas like Lancashire, in England, and New Bedford and Fall River, in America, were thought to be so favored by nature, no humidification of mills was at all necessary. What happens to fog when you warm it seemed to have been left out of consideration.

But here and there, in England, America, and elsewhere, there were men of an inquiring turn of mind. Among them were men who were testing the physical properties of textiles; their sensivity to changes in atmospheric conditions, particularly moisture. And they found that moisture tended to increase pliability and toughness; to reduce readiness to generate "static." In cotton—and in linen and jute as well—it was found that moisture made yarns stronger and more compact.

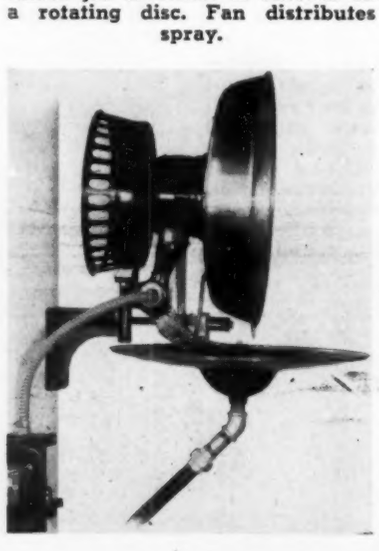
And so the use of humidifiers was gradually increased. But there was a lot to learn. Just as radiators must be shut off at times, even in winter, so it was learned that the use of humidifiers had to be tempered at times. At first this tempering was done by hand, and one might say by whim.

Control Instruments. But along about 1905, the first practical humidity regulators made their bow. They were designed to use such

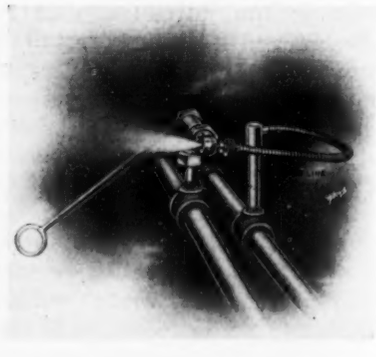
Illustrations for this article were furnished through the courtesy of American Moistening Company, The Bahnson Company, Carrier Corporation, Parks-Cramer Company, and Walton Laboratories, Inc.

An early water-under-pressure spray type humidifier, without fan, shown open for cleaning. Later models are equipped with fans.

A centrifugal type humidifier. Small jet of water is thrown on a rotating disc. Fan distributes spray.



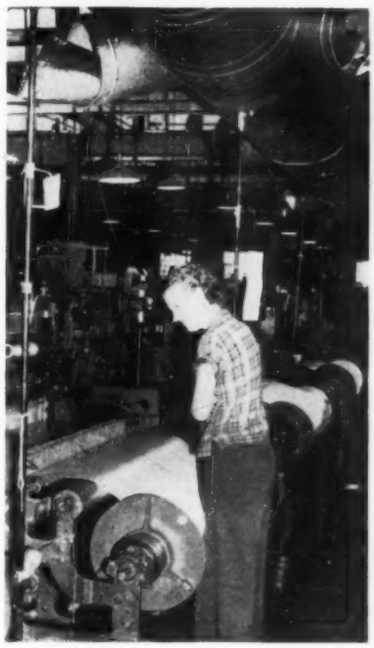
One of the early compressed air atomizer type humidifiers. Recent models are automatically self-cleaning.



hygroscopic materials as wood or hair to transmit motion to valves or switches. Improved models of this type are in current use. An important advance in regulation came a bit later. Applying the principle of the sling psychrometer, the wet and dry bulb differential regulator appeared.

These two types of humidity regulation—the hygrostat and the psychrostat—are as important as humidifiers themselves. For without them humidification would run berserk; with them its powerful forces are always held in check. In fact, the benefits of improved humidification and present-day air conditioning would be quite impossible without precise and dependable automatic regulation of humidity, temperature, and air change.

As speeds of textile machinery kept stepping up, power to operate them doubled or tripled, or even quadrupled. And so the use of artificial humidity—once a matter of indifference, or at best considered optional—became a necessity.



A 40-year old "air conditioning" installation, still in use.

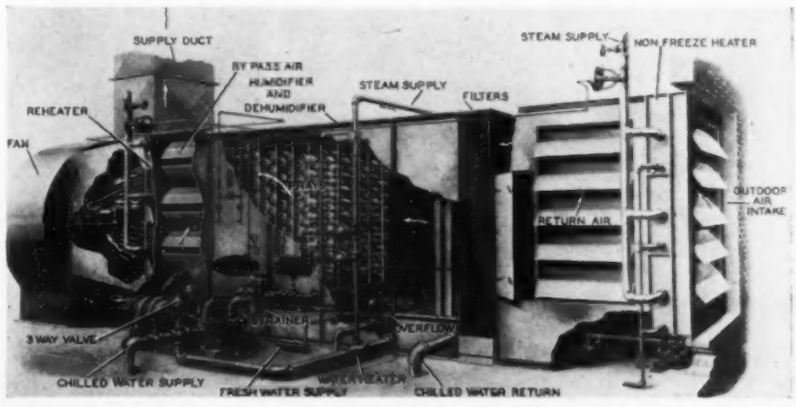
Air Changers. In the early history of humidification, textile mills were supposed to be shut up like a bottle; windows and doors were supposed to be kept closed. Humidifier contracts imposed that condition, for it wasn't the function of any humidifier system to humidify all out-of-doors. Nor did any contractor wish to take on that responsibility. But in the modern mill, with its high factors of heat, it is necessary to get the treated air out—and quantities of fresh air, in, so that the high evaporative cooling capacity of the humidifiers may be utilized. Consequently another important advance took place. The automatic airchanger was developed.

Methods for controlling ventilation or "air change" range from simple pressure type fans, to airchangers comprising air mixing chambers and connecting ductwork with many adjustable outlets. When properly installed and controlled, these airchangers cooperate with locally distributed humidifiers to maintain relative humidity with an excellent degree of uniformity, and to keep room temperature down to reasonable levels both in summer and in winter. Such systems are particularly applicable in rooms where present humidifying capacity is adequate, or can be made so without great expense.

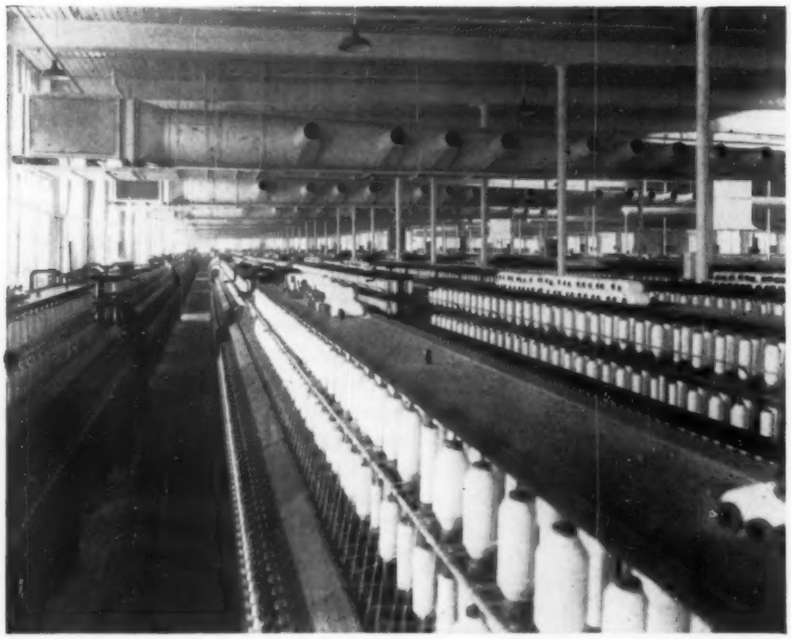
Central Station Types. Where much additional humidifying capacity is required, or for new installations, it often works out well to supply some or all of the humidifying and evaporative cooling by an air washer system of the centralized or semi-centralized type. Central or ceiling station air conditioning for textile mills is becoming increasingly popular for many reasons. Heating may be combined with humidification. All air supplied to manufacturing departments may be screened and washed and may be specially filtered. Refrigeration may be included, or may be added later. These points will be considered in subsequent paragraphs.

The current phase in textile mill air conditioning is characterized by the adoption not only of adequate evaporation, but also, in a growing number of cases, by these additional provisions for all-around control and uniformity. Not only is close control of humidity now being emphasized as a year round requirement, but temperature control is recognized as of almost equal importance for many processes and products, and for the health, comfort, and well-being of the operatives. In addition, ample ventilation, good air circulation, freedom from excessive drafts, and cleaner, purer air are among the important features of complete textile air conditioning.

The trend toward cleaner and cooler air in textile mills is worthy of special comment. Although humidification reduces the breakage of textile fibers and lessens



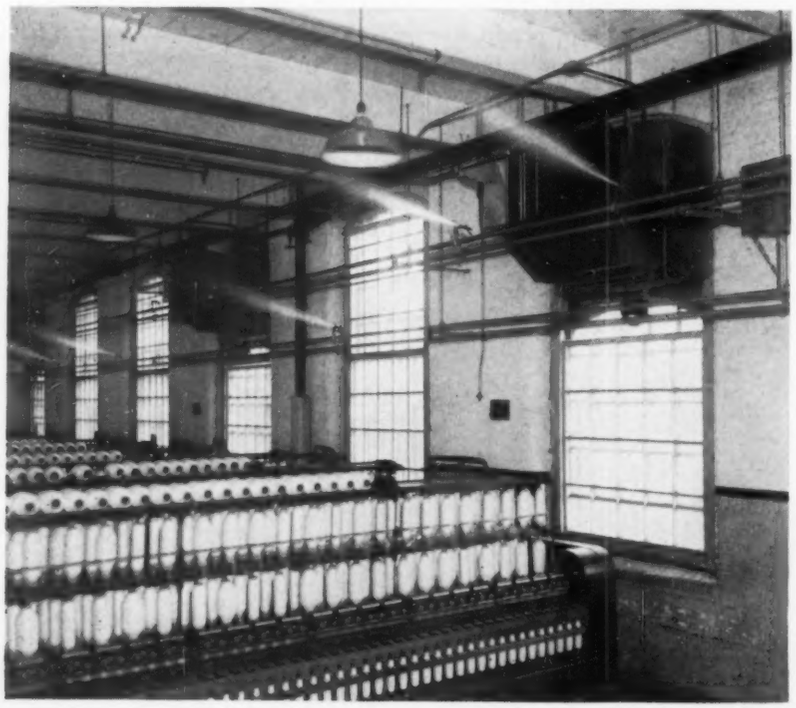
Typical central station unit combining all functions of complete air conditioning. Central or ceiling station air conditioning for textile mills is becoming increasingly popular.



Unit duct system, containing centrifugal humidification for evaporative cooling, ventilating, and air circulating.

the formation of "fly," more complete air conditioning is required if atmospheric impurities are actually to be removed. In localities where the air contains non-wettable impurities which might cause discoloration of the product, a high percentage of even the finest dust and soot particles may be removed by air treating systems which include filters of the electrostatic type. For these reasons the use of central station humidifying and air conditioning has been growing in recent years and is likely to increase as time goes on. For economy in first cost and in operating cost, and for flexibility of control, combination central station air conditioning with booster humidification by atomizers or other direct types, offers many advantages, which account for its growing popularity.

Ductless type ventilating and air circulating unit used in conjunction with atomizer humidifiers to effect evaporative cooling. Other systems designed for the same purpose employ ducts.



Refrigeration. As to methods for reducing the temperature of hot mill departments, the value of evaporative cooling has long been recognized. The high humidifying capacities now recommended provide correspondingly high evaporative cooling potential, which may be utilized if ventilation is ample and properly controlled. Adequate systems of the airchanger and central station type provide this control. These facts account in part for the growing use of such systems. In cases where more cooling is required than can be provided by evaporative cooling and air change, refrigeration becomes necessary. The trend toward central station systems with refrigeration (or to which refrigeration may be added at any time) is unmistakable—particularly in localities where outdoor wet bulb temperatures exceed 75° F on many days in summer.

The term "air conditioning" originated, as I have said, in the textile industry. Its formal debut occurred on May 10, 1906, at the 10th Annual Convention of the American Cotton Manufacturers Association in Asheville, N. C. Here Stuart W. Cramer delivered an address on "Recent Developments in Air Conditioning," in which he said:

> "In the building and equipping of mills, you are accustomed to consider heating and humidifying separately, without regard to that interdependence which is so strikingly brought to notice upon even the crudest effort at hand regulation. And the moment you attempt the refinement of automatic regulation, you are confronted with another problem, and that is ventilation. Parenthetically, I would also mention air cleansing. And so, I have used the term 'Air Conditioning' to include humidifying and air cleansing, and heating and ventilation."

Continuing, Cramer dwelt on the

need of considering health and comfort of workers, as well as conditions favorable to the material being manufactured.

In the appendix to Volume II of "Useful Information for Cotton Manufacturers," dated 1904, Cramer outlined and described a new "system of air conditioning" for controlled ventilating, heating, humidification and air cleansing. Quoting him again:

"Features Peculiar to This System:
(1) The air in a mill or factory is positively and automatically regulated the year round, both as to temperature and humidity, to conform to any predetermined scale desired. . . .
(2) Humidity in a mill or other room is rapidly raised to a predetermined point and maintained.
(3) Excessive humidity, such as in dog days, is reduced to a condition not greatly in excess of normal.
(4) Complete and satisfactory ventilation is provided, the air being tempered both as to heat and moisture as it enters and in any desired quantities. . . .
(5) Ventilation can be partly or wholly stopped without discontinuing humidification.
(6) Humidification is automatically stopped when the desired percentage has been obtained without discontinuing the ventilation.
(7) Air cleansing and purifying is positively and effectually accomplished on a predetermined basis of treating all the air in the room as often as may be desired. . . ."

That, 44 years ago, was a preview of what was coming, and all these years have elapsed before the full importance of these objectives was generally accepted. I would emphasize that even during the early development period, both humidity and temperature were controlled, and provision was made for ventilating and air cleansing. The principal essential difference between the art then and now is in the relative importance given to the various functions and the differences in the provisions for adequate capacities, proper distribution, and control features in the design of the systems.

Another important difference is that air movement, which is considered so important today, both for manufacturing and comfort conditioning, seemed to be more or less overlooked. At least it was not then listed as among the major objectives.

Still another difference is that refrigerative cooling and de-humidification seldom were included in the early textile air conditioning, whereas the growing importance of these functions is now being recognized for some processes, particularly in certain localities.

A Science. Concurrently with Cramer's introduction of air conditioning to the textile industry, and his development of improved types of humidifiers and humidity regulators, several other engineers were active in the development of new or improved equipment and also the science of industrial humidifying, heating, and ventilating. The work of Willis H. Carrier was outstanding. An important milestone in the technology of air conditioning occurred when Carrier presented his memorable paper on "Rational Psychrometric Formulae" at the annual meeting of The American Society of Mechanical Engineers in 1911. This paper demonstrated the scientific background of air conditioning, took it out of the rule-of-thumb category. It encouraged many other valuable studies by numerous physicists and engineers, and was the forerunner of much additional literature on the subject.

Laws of Moisture Regain. The

Ductwork of central station air conditioning system in modern weave room. Such central station systems are sometimes supplemented by direct humidification.

industry also owes much to the painstaking researches of William D. Hartshorne, for many years agent of the Arlington Mills, who labored long to establish and check his laws of moisture regain in textiles. He was one of many in this country and abroad who during this 50-year period have conducted valuable researches on moisture in textiles. Hartshorne published numerous papers, and finally summarized his data in a paper entitled "The Moisture Content of Textiles and Some of Its Effects," presented at the annual meeting of the American Society of Mechanical Engineers in 1917.

About this time, Committee D-13 on Textile Materials of the American Society for Testing Materials was organized, and Hartshorne became its first chairman. This committee of active textile technologists, through its thirty-odd subcommittees and sections, has accomplished much in standardizing textile testing procedures and in compiling useful information in which moisture plays an important part. Other textile societies and clubs have been organized, whose activities include researches on moisture problems.

Research. When, in the early 20's, the American Society of Heating and Ventilating Engineers, in cooperation with the U. S. Bureau of Mines and the U. S. Public Health Service, began a long series of research tests on the relations between atmospheric conditions and human comfort, a real impetus in popularizing the subject of air conditioning was established. Based on these tests, charts of "effective temperature" for various combinations of temperaure, relative humidity, air motion, dress, and physical activity were prepared by F. C. Houghten and C. P. Yaglou, and were published by the A.S.H.&V.E. Other valuable researches on the relation of atmospheric conditions to human comfort have been conducted, such as those under the direction of Philip Drinker of the Harvard School of Public Health.

These researches served to correct some of the popular misunderstandings about humidity, temperature, and air motion, and demonstrated the value of humidification and air conditioning as a boon to textile workers. They proved the fallacy in the old saw, "It isn't the heat, it's the humidity," by showing that if an increase in relative humidity of 5% is accompanied by a drop in room temperature of about 1° F, the resulting atmosphere will feel cooler. Actually, by proper humidification, air temperature can be reduced 2° F or more for each 5% rise in relative humidity.

Humidifier unit equipped with spun glass filter which provides protection from lint and dust. Unit vaporizes better than a gallon of water per hour.

The Future. Looking toward the future, there appears to be a continuing trend toward the more complete types of air conditioning. Separate heating and humidifying systems with natural window ventilation will continue to give excellent satisfaction in many instances, particularly if the humidifiers are of improved types, if evaporative capacity is ample, and if automatic regulation is good.

As present humidifying systems become worn out and are replaced, as new and still better textile machinery is installed, as still faster machine speeds are sought with the same or better production efficiency, and as the competitive market demands even better quality at lowest possible price, the more complete types of textile mill air conditioning no doubt will be considered an ever growing essential.

In Retrospect

(Textile Industries, July '07)

Twelve years ago the first electric motor-driven textile mill was put in operation in a southern cotton mill, aggregating about 700 hp. Today there are in the United States alone over 180 electrically operated textile mills, with one system of induction motors having a total capacity of 140,000 hp.

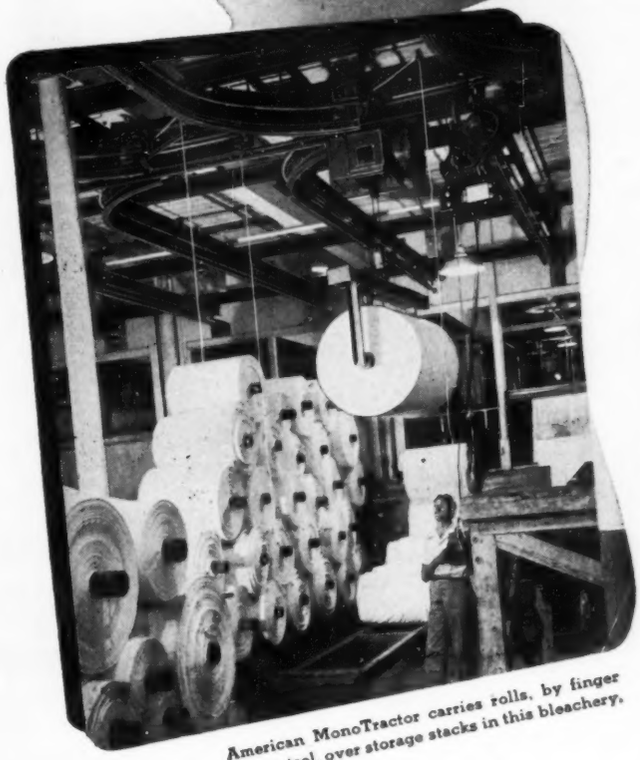
When it is considered that this latter figure represents two-thirds of the total electrical horsepower installed in textile mills in the United States, the increase in the adoption of the flexible system drive is remarkable.

(Textile Industries, December '09)

Announcement was made recently of a commission of eminent men who were called together by John D. Rockefeller for the purpose of forming a permanent organization to wage war on the hookworm in the South.

The malady is brought to the mills by operatives who leave the small insanitary farms to take up work in the mills, and it has been shown that the condition of the operatives is improved after coming to the mills due to the highly sanitary conditions that are insisted upon by the authorities.

Cloth Rolls go UP and OVER



American MonoTractor carries rolls, by finger tip control, over storage stacks in this bleachery.

Rolls of cloth go up with chain hoist operating on American MonoRail 1-ton hand-pushed interlocking crane. Spur tracks permit the hoist to serve all machines in the finishing room.

Many textile mills are eliminating much of their floor congestion by installing American MonoRail "Up and Over"* Handling Systems.

In these particular mills, cloth rolls are raised and transported overhead to other departments. Increased production at lower costs has resulted.

With "Up and Over" type of handling from receiving to shipping, an overhead track or crane system does a better, quicker job with less maintenance.

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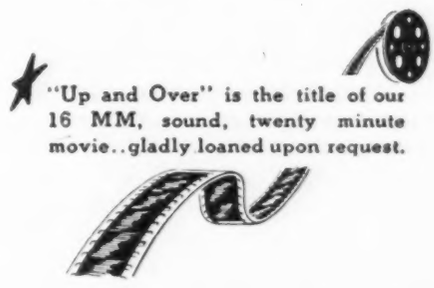

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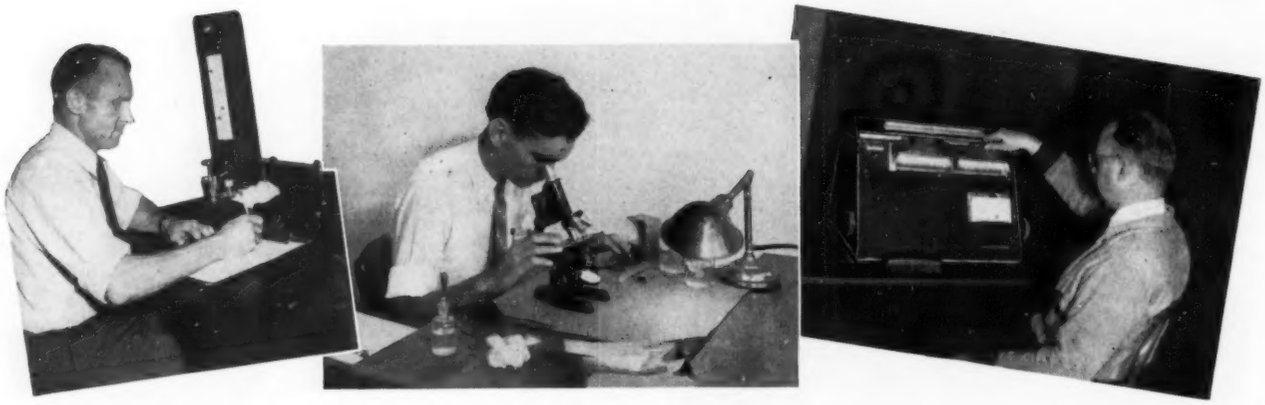


50 Years of Progress in

Textile Research

By JULIAN S. JACOBS
Editor "Textile Research Journal"

Percentage of textile research comparatively low. Mills having research programs believe research improves their competitive position.

GENERALLY, it is conceded that until the present century industrial research was largely a matter of the unorganized effort of individuals. Industries were established to exploit the discovery or the invention of some individual whose genius continued to be largely responsible for further improvements on his original idea and for the development of new ideas.

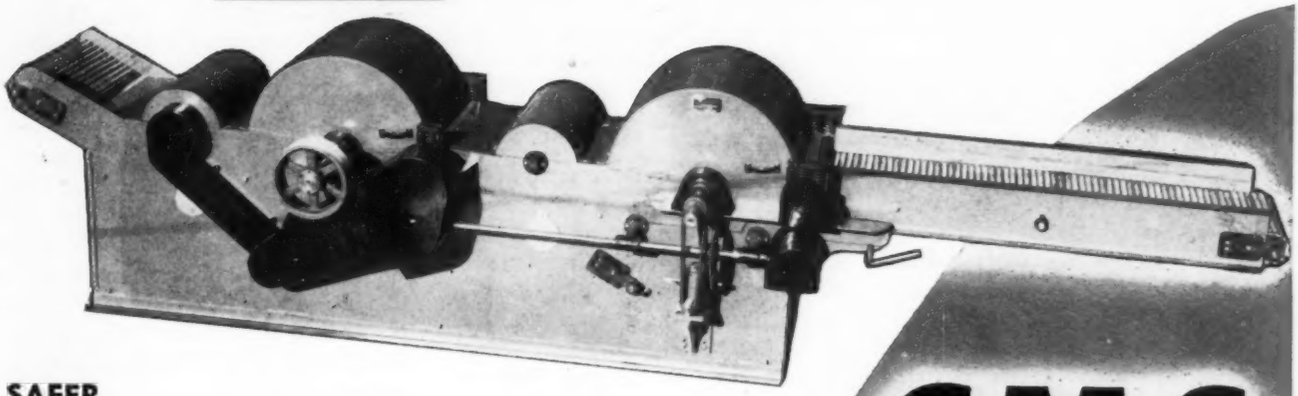
In the early 1900's a few companies such as the Bell Telephone Company and large chemical manufacturers organized separate research departments. A typical motive for the movement is revealed in the statement of President Jewett of the Bell Company—"The [telephone] industry had outgrown its ability to progress wholly on random invention . . . and it had also outgrown the second stage in which inventive ability and genius was teamed up with engineering skills." Furthermore, according to Mr. Jewett, although the objectives of telephone development were felt to be attainable on the basis of existing or easily ascertainable knowledge, in order to use this knowledge it was necessary that in its application the same type of analysis and techniques be used that had been employed in developing fundamental science.

Industrial Research, 1920-1940. However, as Bartlett[1] has pointed out, it was World War I which first focused the attention of the public upon the accomplishments of applied science, which greatly stimulated the growth of industrial research. Surveys conducted by the National Research Council show that in 1920 about 300 laboratories were engaged in industrial research; in 1940 the number had increased to more than 2,200. Meanwhile the total personnel had increased from approximately 9,300 to over 70,000, and now industrial research has reached the proportions of a major industry.

Used In Leading Mills

Only one year has passed since the first CMC Waste Machine was delivered. Today CMC Waste Machines are installed in about fifty of America's leading mills and the CMC is acknowledged to be the most outstanding machine of its kind on the market.

The CMC has important patented features which are found on no other waste machine. It is far safer and more efficient and it holds breakage of fibers to a minimum.



SAFER
Uses no suction fan or waste pit, thus eliminating fire hazards.

MINIMUM FIBER DAMAGE
Controlled air pressure prevents blow-back.

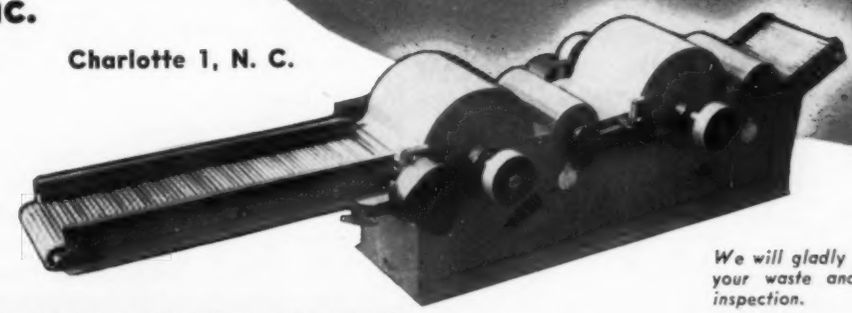
COMPACT
Takes up small floor space.

EASILY INSTALLED
Requires no dust pipes.

FLEXIBLE
Easily adjusted to process different length staples and synthetic waste.

ALL PARTS EASILY ACCESSIBLE

CMC waste machine



Carolina Machinery Company, Inc.

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In the textile industry it is perhaps natural that the progress of research has been slower than in other major industries, such as the chemicals. It is one of the oldest of the industries, and its processes are the result of many centuries of gradual development.

Early Research at Merrimack. However, the textile industry has the distinction of having established one of the first industrial research laboratories in this country. Many a research laboratory has evolved from the dingy corner allotted to a plant chemist, and an early example was that of the Merrimack Manufacturing Company at Lowell, Massachusetts. This laboratory was established by Samuel Luther Dana[2], who served the company as resident and consulting chemist from 1834 until his death in 1868.

Dr. Dana first attained renown through his study of the chemical changes which took place in the bleaching of cotton fabrics preparatory to printing them, from which he developed what became known as the "American system" of bleaching. This process was not only widely adopted in the textile industry, but was also highly praised as a piece of scientific investigation, a description of it being published in the *Bulletin de la Societe Industrielle de Mulhouse* in 1938.

Until comparatively recently, textile manufacturers for the most part depended upon their suppliers to work out improvements in machinery and to introduce new chemical compounds. It required World War II to bring about close cooperation between the mill, the machinery manufacturer, and the chemical manufacturer with his scientific know-how, which has resulted in such important developments as are being seen in spinning, in wet processing, and in many other processes.

That very little research was conducted by manufacturers of textiles before World War I is evident from the Bulletins of the National Research Council. Of the 49 firms (not including producers of rayon yarn and staple fiber) listed in 1946 as having research organizations, only 2 initiated their research prior to 1900. These two were Pacific Mills, in 1880, and Cheney Brothers, in 1892. Only 2 companies started research between 1900 and 1909; 8 between 1910 and 1919 (all of these in the latter half of the period); 9 between 1920 and 1929; 20 between 1930 and 1939; and 6 between 1940 and 1945. Three did not give date.

Table I. Distribution of research personnel, 1938, and growth of research personnel, 1927-38, by industrial group.

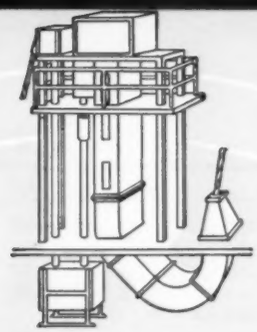
Industrial group	Percentage distribution, 1938	Percentage increase, 1927-38
Total	100.0	133.3
Chemicals and allied products	21.5	175.5
Petroleum and its products	11.4	538.7
Electrical communication	9.5	3.7
Electrical machinery, apparatus, and supplies	6.8	58.1
Consulting and testing laboratories	6.0	127.0
All other machinery	5.2	133.2
Rubber products	5.1	101.8
Motor vehicles, bodies, and parts	4.4	190.2
Agricultural implements (including tractors)	4.1	184.7
Miscellaneous	4.0	205.0
Iron and steel and their products, not including machinery	3.5	189.4
Food and kindred products	3.2	255.1
Stone, clay, and glass products	3.2	166.4
Nonferrous metals and their products	2.7	72.7
Radio apparatus and phonographs	2.5	1,600.0
Utilities (gas, light, and power)	2.2	89.4
Paper and allied products	1.7	177.5
Trade associations	1.3	96.9
Textiles and their products	0.8	252.9
Forest products	0.4	190.9
All other transportation equipment	0.3	17.0
Leather and its manufactures	0.2	151.6

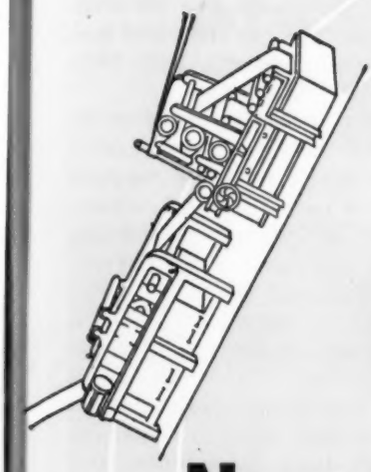
National Bureau of Standards Research. Among the first projects undertaken at the National Bureau of Standards after it was established in 1901 were testing and research on textiles and textile raw materials. The earliest account of this work, published in 1913, dealt with the physical testing of cotton yarns, including data on the size, twist, and tensile strength of single and two-ply cotton yarns, and on their behavior under different relative humidities.

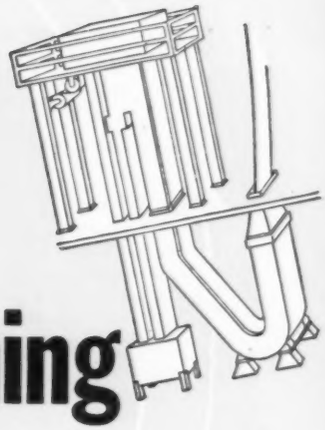
From then through 1920 the Bureau published 14 technical reports; from 1921 to 1930, 77 reports; and from 1931 to 1939, the total was 139. This number did not include numerous reviews of progress in textile technology or reports dealing with standard specifications. This increase in number of publications, which is indicative of the expansion of textile research at the Bureau, roughly parallels the increasing interest in research among the textile manufacturers, as shown in the preceding paragraph.

National Research Council Surveys. It is difficult to appraise accurately the growth and the extent of research. In the surveys conducted by the National Research Council and published at intervals beginning in 1920 in its Bulletins[3], the Council attempted to make a complete listing of industrial laboratories in the United States, together with their personnel and their types of research; commercial research laboratories and institutional laboratories conducting industrial research were included. However, a scanning of these lists reveals many omissions, and there is no clear indication whether personnel engaged in control and testing, as distinct from research workers, are excluded. Nevertheless, the figures are worth studying as revealing trends. The National Association of Manufacturers also conducted a recent survey, which will be discussed later in this paper.

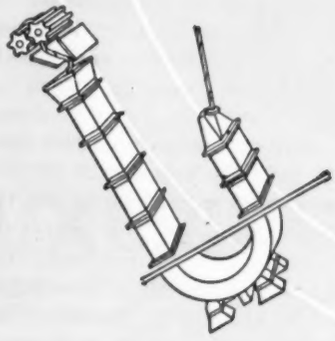
Perazich and Field[4] have made a study of the growth of industrial research based on the first six surveys conducted by the National Research Council. They estimate

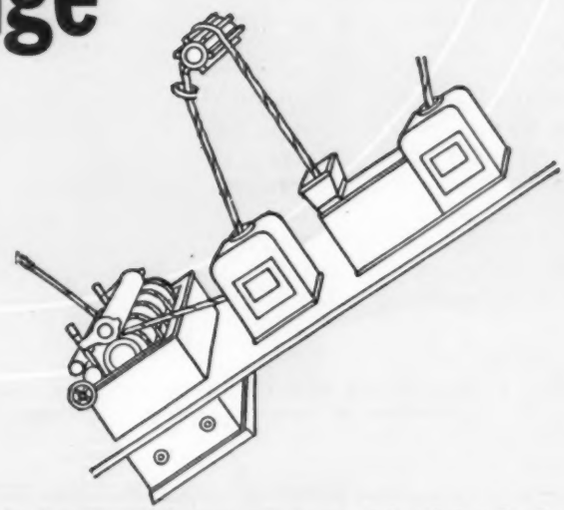






Previewing your New Continuous Bleaching Range





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You may decide that a single stage Butterworth Continuous Bleaching Range is adequate for your needs. Or you may determine that two-stage operation is best for your mill. You may want to bleach in rope form . . . or you may want to bleach in open width. You may prefer either the DuPont or the Becco process.

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Industrial group	1927	1937
Chemicals and allied products	137	303
Radio apparatus and phonographs		232
Petroleum and its products	33	207
Rubber products	78	173
Electrical machinery, apparatus, and supplies		116
Electrical communication	89	103
Stone, clay, and glass products	15	47
Nonferrous metals and their products	29	44
Motor vehicles, bodies, and parts	18	41
Utilities (gas, light, and power)	18	32
All other machinery	16	32
Paper and allied products	12	28
Food and kindred products	6	16
Iron and steel, and their products, excluding machinery	6	15
Other transportation equipment	9	9
Forest products	1	3
Leather and its manufactures	1	2
Textiles and their products	1	2

Table II. Number of research workers per 10,000 wage earners in selected industrial groups, 1927 and 1937.

that in the first two surveys the coverage in terms of personnel was about 80 per cent, and that since the earlier surveys were probably the most deficient with respect to coverage of the smaller organizations, the coverage in terms of companies is probably smaller than that for personnel. However, they are referring to coverage as it applies to the average of all industries reporting.

The principal data relating directly to the textile industry are given in Tables I and II and in Figure I.

Textile Research Low in 1938. In Table I, which shows the distribution of research personnel in 1938 and the increase in research personnel from 1927 to 1938, textiles and their products are fourth from the bottom of the list, with 0.8 per cent of the total of the groups listed. Chemicals and allied products lead, with 21.5 per cent; petroleum and its products are next, with 11.4 per cent. However, on the percentage basis, for this period textiles, with an increase of 252.9 per cent, are exceeded only by radio apparatus and phonographs, with 1,600.0 per cent increase; petroleum and its products, with 538.7 per cent; and food and kindred products, with 255.1 per cent.

In Table II textiles stand at the bottom of the list, having had in 1927 an average of one research worker for each 10,000 wage earners, and, in 1937, two research workers (an increase of 100 per cent). Chemicals again head the list, with 303 research workers in 1937 for each 10,000 wage earners.

Figure 1 shows the distribution of the laboratories according to their functions. Here, in 1931 textiles were third from the bottom with respect to the percentage of research done on new products (approximately 17 per cent). The remainder of research effort is about equally divided between improving quality and reducing costs.

In a report to the National Research Council, Cooper[5] discusses factors of distribution and growth of industrial research based on N.R.C. surveys. In Fig. 2 is shown the trend of research employment in all industry from 1920 to 1940 as a significant measure of the growth of research. The figures for research personnel represent the total number of employees engaged in or assisting with technical research. The expansion was rapid from 1921 to 1931 and again from 1931 to 1940. Between 1931 and 1933, however, the business depression caused many companies to curtail their research activities. The N.R.C. surveys show a decrease of almost 35 per cent during this period. How employment in the textile industry compares with industry as a whole is not shown.

Research expenditures for dif-

Fig. 1. Distribution of companies carrying on research, by major function of laboratories and by industry, 1931.

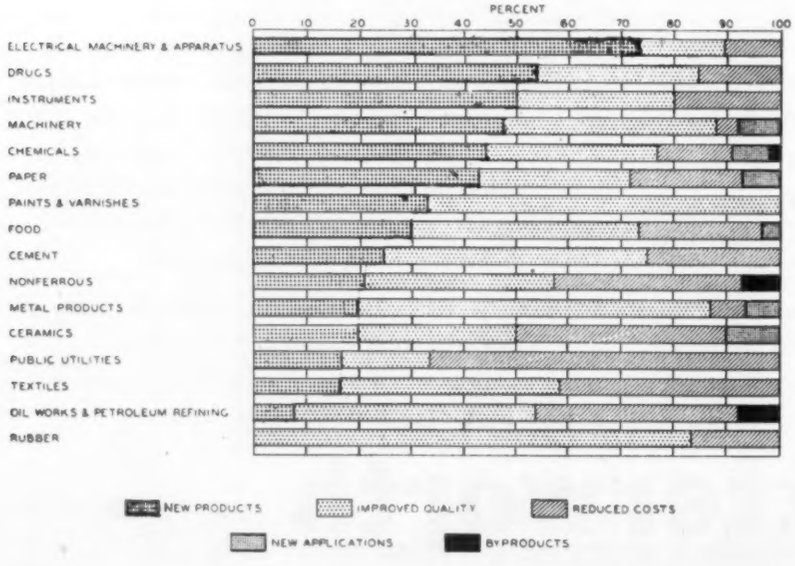
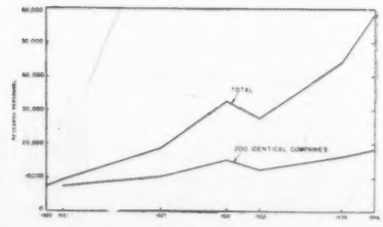


Fig. 2. Personnel employed in industrial research, 1920-1940.



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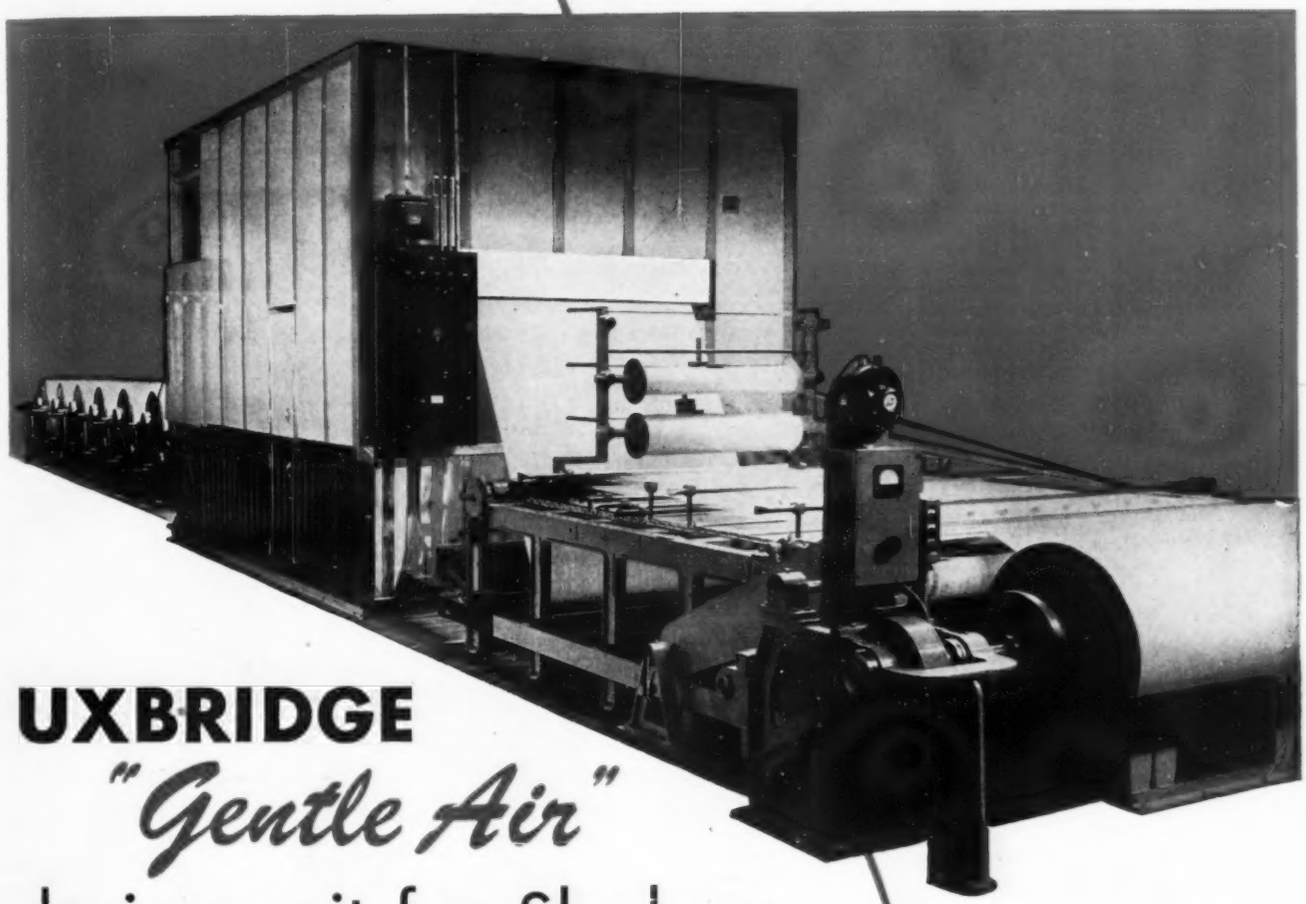

UXBRIDGE *"Gentle Air"* drying unit for Slashers

Heavy work, light work, it's all the same to the "Gentle Air." A wet splitting device attached to the back end of the drying unit breaks the size envelope before drying takes place and minimizes stretching and tearing at the front end. When you consider this important feature, plus 1,000 pound production per hour, plus perfectly dried warps, can you afford to be without a "Gentle Air"?

- Fits between front and back ends of existing slashers.
- Processes any spun fibre including cotton, wool, worsted, or rayon.
- Only 14 yards of yarn inside drying area.
- Yarn sheet 60 to 70% dry, not tacky at first contact inside dryer. No size transfer from rolls to yarn.
- Instant heat and air circulation. Instant cooling.
- Fully insulated, completely automatic.

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electrical products of the highest quality have served the textile industry for

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CONDULETS*

The illustrations show a representative selection from the thousands of types and sizes that are listed in Crouse-Hinds Condulet catalog. There is a wide variety of highly specialized types in each classification: CONDULETS for use in non-hazardous locations; VAPORTIGHT CONDULETS for use where exposed to weather, moisture, steam or non-combustible dust; DUST-TIGHT CONDULETS for use where combustible dust creates hazardous conditions; and EXPLOSION-PROOF CONDULETS for use in flammable atmospheres.

FLOODLIGHTS

Floodlights provide the most efficient method of lighting industrial yards, auto parking lots, athletic fields and play grounds. Usually it will cost much less to project light a considerable distance with Crouse-Hinds floodlights than to run cable and install local lighting.

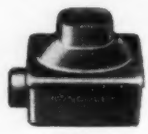
The illustrations show two of the most widely used floodlights selected from the dozens in Crouse-Hinds complete line.

Write for additional information.

**CONDULET is a coined word registered in the U. S. Patent Office. It designates a product made only by the Crouse-Hinds Company.*

Type C Obround Condulet

Type GRF Condulet



Type FS Vaportight Push Button Station Condulet

Type LB Obround Condulet

Type UNH Hook Flexible Fixture Hanger

Type FSC Vaportight Plug Receptacle Condulet

Type ALC Cushion Flexible Fixture Hanger

Type UNJ Ball Flexible Fixture Hanger

Type AHG Vaportight Flexible Fixture Hanger

Type FOH Hanger for Fluorescent Lighting Fixtures

Type ARRC Condulet with Arktite Receptacle and Threaded Cover

Type APJ Plug with Fastening Ring

Type DVSP Dust-Tight and Vaportight Panelboard

Type FSC Two-Gang Vaportight Switch Condulet

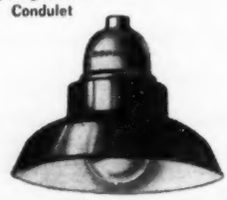
Type VS Vaportight Hand Lamp with Rubber Handle

Type MDB Floodlight 500 – 1000-Watt

Type MUA Alumalux Floodlight 750 – 1500-Watt

Type EVA Explosion-Proof Lighting Condulet

Type DLA Dust-Tight Lighting Condulet 100 – 200-Watt



Type VDA Vaportight Lighting Condulet 50 – 200-Watt

Type VDB Vaportight Lighting Condulet 300 – 500-Watt

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SELECTION OF VAT DYES FOR CONTINUOUS DYEING PROCESSES

The widespread installation of equipment for applying vat dyes to fabrics by methods based on pigment padding followed by reduction and fixation of the dye in a high temperature liquid bath, or in a steam atmosphere, has created a demand for more data on the properties of vat dyes. Unusually high temperatures are used in these newer methods because they contribute two main advantages:

1. The rate of reduction is tremendously increased, and highly dispersed vat dyes, typified by the Calcoloids**, reduce completely in a few seconds.

2. The rate of diffusion of the leuco vat dye into the fiber is tremendously increased. Excellent penetration and fixation result and the full fastness inherent in vat dye is obtained although the duration of dyeing is only a few seconds.

The intelligent selection of dyes for application by high temperature methods must be based on accurate information about the speed of reduction, leuco stability and affinity for the fiber of the individual vat dyes. Such information is given in Calco Technical Bulletin No. 793.

Considerable information is given also about the full prewar vat dye line of the I.G. as well as about the Calco line of vat dyes. A color plate, diagrams and tables supplement the text. A laboratory device for investigating the behavior of padded cloth during passage through a liquid reduction bath is described. This device is of help in determining how much dye must be added to the reduction bath prior to a commercial run in order to maintain a constant shade on the cloth from start to finish of a run.

POPULAR DYES FOR TOWELS

Most of the popular shades for towels can be matched with the following dyes:

- *Calcosol** Copper Brown Double Powder—Dusty Rose
- *Calcosol Blue BLD Double Powder—Blue
- Calcosol Jade Green N Supra Double Powder—Green
- Calcosol Fast Yellow Paste—Gold
- *Calcoloid Yellow GCD Double Powder—Canary
- *Calcoloid Golden Orange GD Double Powder—Peach
- Calcosol Violet BN Extra Paste—Lavender

*Paste types available also. **Trademark

These types are all suitable for dyeing these towel shades either in raw stock or yarn form. They are all compatible and can be combined to produce a large range of desirable shades with the desirable fastness properties required for towels.

VAT DYE FASTNESS WITH GREATER EASE OF APPLICATION

Calco soluble vat dyes are suggested for roller printing, screen printing, cotton dyeing, rayon dyeing and wool dyeing. They print well in conjunction with naphthol and stabilized azoic printing colors.

These dyes give the corresponding vat dye fastness with greater ease of application. On wool they are recommended mainly for tops or raw-stock dyeing with resultant excellent all around fastness.

Since the formulations and procedures will vary with the type of material and equipment, we suggest your getting our recommendations for your specific problem.

BRILLIANCE AND CONSISTENCY IN SCARLETS AND PINKS

Printers require a full range of scarlets and pinks for fashionable shades in prints.

The following are recommended for full brilliant shades of scarlet and pink on rayon or cotton:

- Calcosol Printing Scarlet 2GHN Paste
- Calcosol Printing Scarlet 2B Paste
- Calcosol Printing Scarlet 3B Paste
- Calcosol Pink FFP Paste
- Calcosol Pink FBP Paste

Maximum brilliance of shade and consistent performance are paramount properties of these printing pastes. They are widely used for the printing of dress goods, draperies and other fabrics.

FOR THE TEXTILE BOOKSHELF

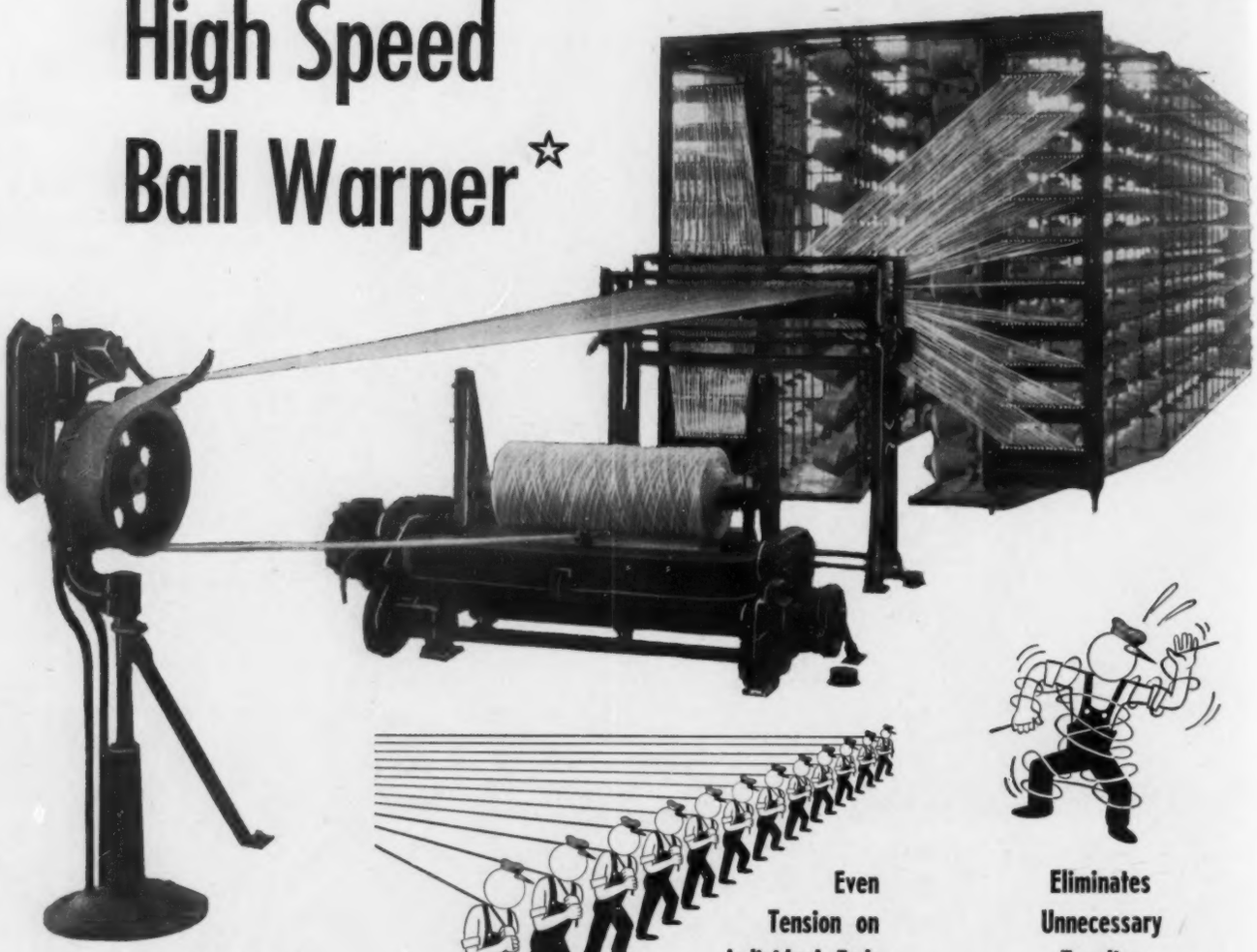
Application of Microscopy to the Textile Industry (Calco Technical Bulletin No. 796)—Points out how the microscope, if operated by qualified personnel, can be a useful tool in the manufacture of a satisfactory product at the lowest possible cost.

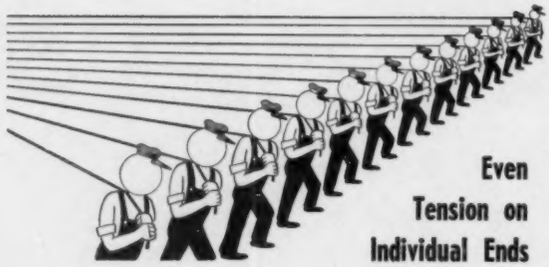
Vat Dyeing of Wool (Calco Technical Bulletin No. 797)—Describes a new process for the application of the complete line of Indigoid and Anthraquinone Vat Dyes to certain types of wool materials.

"Hey Sis, Repulsive-but-Rich is here!"

The Cocker ....Assures Better Dyeing, Mercerizing and Weaving

High Speed Ball Warper ☆





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Eliminates BREAKS

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Ball warps produced on this machine save you money on your dyeing, mercerizing and weaving operations as well as in warping. Each Cocker Ball Warper is individually motor driven at speeds up to 500 yards per minute and is equipped with automatic counter and leasing clock. We will be glad to give you full information on request.

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ferent industries as a percentage of dollar value of output are shown in Fig. 3. The bars show expenditures for 1938 as compared to those for 1927. In this case radio apparatus and phonographs lead, electrical communication industries are second, chemicals are tied with rubber for third place, and textiles are at the low end of the list.

Textile Research 1940-46. Analysis of the data for industrial research laboratories listed by N.R.C. for 1940 and 1946 reveals the following figures from textile manufacturers:

The total research personnel employed by 44 companies reporting in 1940 was 411, whereas 49 firms reported 1,027 research employees in 1946, a gain of 150 per cent. Eleven companies which reported in 1940 did not appear in the 1946 listing, but in the latter year 16 additional companies reported. Those which dropped out were small organizations, whereas the additions were larger laboratories. The 31 companies which appeared in both reports employed 366 in 1940 and 646 in 1946, a gain of 76.2 per cent for the period.

It may be of interest to note the classification of personnel among 49 companies in 1946: In addition to the directors and their assistants there were employed 217 chemists, 30 physicists, 106 engineers, 335 "technical personnel," and 260 listed as "additional personnel."

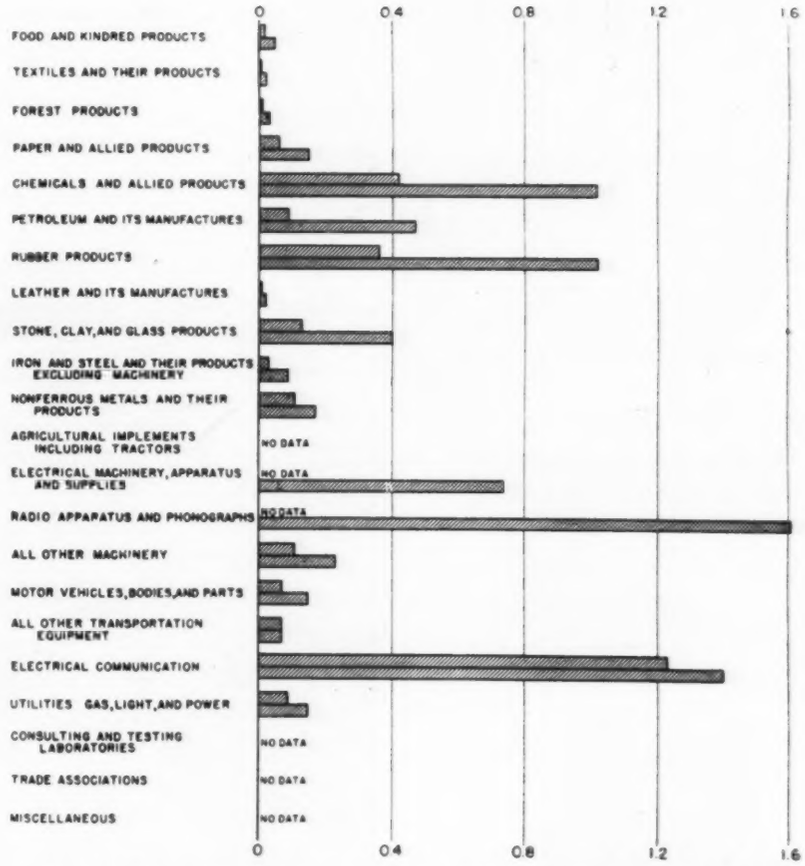

Fig. 3. The percentage of the dollar value of the products of various industries expended for research, 1927 and 1938. The upper bar of each pair refers to 1927; the lower bar to 1938.

National Association of Manufacturers Survey. The National Association of Manufacturers' Patents and Research Committee recently completed a factual survey of the research activities of manufacturers. In a 79-page report[6] the replies to a questionnaire from 983 manufacturers in the various major divisions of industry are analyzed. The survey covers the period from 1939 to 1947, with the figures for 1947 based on estimates for the year.

In replies concerning anticipated expenditures for 1947, manufacturers show an increase of 270 per cent over the prewar year of 1939 in the aggregate amount to be spent on industrial research, and this sum is 14 per cent higher than the total spent by them for research in 1946.

Of the 46 concerns in the textile mill products industry which replied to the questionnaire, 60 per cent (28) have a research program. These 28 manufacturers reported that the aggregate approximation for research expenditure during 1947 was 505 per cent over the amount spent in 1939, and 49 per cent above that reported for 1946.

In Table III the expenditures by various industries are compared. It will be noted that the textile mill products division ranks among the top six industries in its percentage increase in research expenditures.

However, as to the ratio of research expenditures to sales, the comparison is not so favorable to the textile industry. Table IV shows that in 1939 manufacturers of textile mill products who replied to the N.A.M. questionnaire spent 0.45 per cent of their sales dollar for research as compared to 3.17 per cent (Table V) spent in the same year by manufacturers of chemical and allied products. The average of replies from those in all the industries reporting was 1.86 per cent for 1939. It will be seen that a comparison of the data on expenditures in textiles with those of manufacturers of other products parallels the data from surveys of the National Research Council, as shown in Fig. 3.

For companies which reported in 1946, the average ratio of research expenditures to sales was: 0.88 per cent for textile mill products; 1.87 per cent for chemical and allied products, and 1.87 per cent for the general average of all industries. For the textile mill products industry as a whole a wide range is shown, from one concern with a low of 0.13 per cent to

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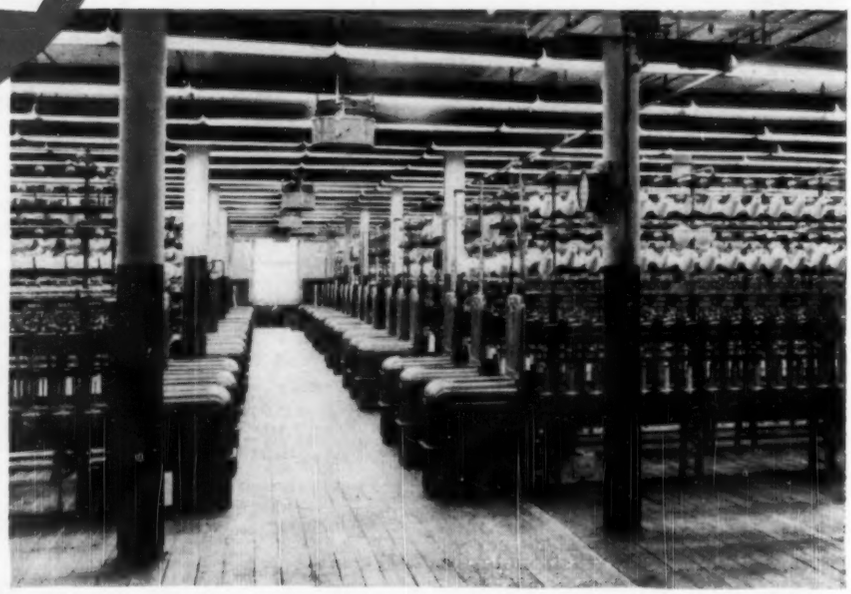
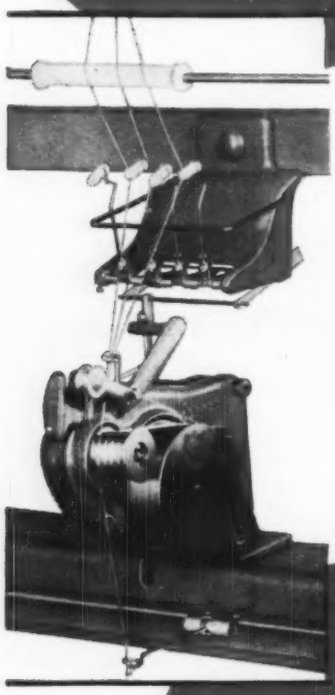
First-Rate Twisting

At Limerick Yarn Mills in Manchester, N. H., Atwood Model 10 Ring Twisters twist two ends of worsted yarn supplied from cones located in a magazine creel. In each of these machines, all 100 spindles are driven by a single, lapless, endless belt which gives equal power to each spindle and produces uniform twist from spindle to spindle.

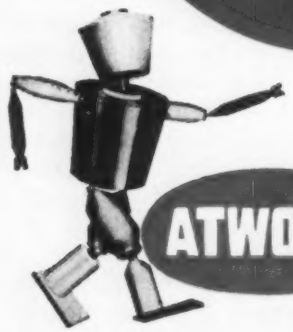




Automatic Stop Motions

GIVE MODEL 10's BIG ADVANTAGE

On the Model 10, each spindle is integrally connected with an automatic stop motion which stops the individual spindle and feed rolls simultaneously. Knots can be tied in single ends, avoiding roller laps and drop ply in the package.



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Model 10 *automatic stop motion for each end and ply*

another, with sales of $1,000,000, with a high of 5 per cent.

Future Textile Research. Expansion of research facilities is planned by about half of the textile manufacturers who at present have research programs (mostly by the larger concerns).

In this industry replies to the questionnaire indicated that the development of new products and improved manufacturing procedure are the principal objectives, with the improvement of existing products as next in importance, followed by salvage of waste material, new uses for existing products, and better raw materials. Replies were practically unanimous as to the effect of the immediate discontinuance of research activities. All agreed that this would weaken the competitive position. Most of the companies with research programs stated that the effect would be felt almost immediately, with a resulting loss in profits.

In conclusion it should be pointed out that reference has not been made to the large amount of research at the government's Regional Research Laboratories, at industry-supported research institutes, and also at commercial research laboratories and endowed institutions. Nevertheless one is struck by the small number of textile manufacturers, even as recently as 1947, who report that they have research programs.

Tables III, IV, and V, courtesy, National Assn. of Manufacturers.

Table III. Research Expenditures of Various Industries

Industry	Anticipated 1947 Research Expenditures	1946 Research Expenditures Reported	% Gain '47 Over '46	1939 Research Expenditures Reported	% Gain '47 Over '39
Food & Kindred Products	$ 7,075,336	$ 4,941,503	43	$ 1,606,118	340
Textile Mill Products	2,196,452	1,477,225	49	362,313	505
Apparel	52,000	32,500	60	6,000	766
Lumber & Wood Products	898,000	653,567	38	144,978	520
Furniture & Fixtures	176,500	146,900	20	42,600	320
Paper & Allied Products	3,983,500	3,439,176	16	1,077,982	277
Printing, Publishing & Allied Industries	1,153,500	708,613	63	182,136	530
Chemical & Allied Products	27,624,000	24,890,072	11	5,942,183	382
Products of Petroleum & Coal	47,232,400	39,850,225	19	13,178,000	276
Rubber Products	10,360,065	9,571,360	8	3,772,890	175
Leather & Leather Products	300,250	227,250	32	104,000	191
Stone, Clay & Glass Products	4,670,258	4,247,906	10	1,630,548	187
Primary Metal Industries	4,308,000	3,572,286	20	1,568,140	176
Fabricated Metal Products	6,750,455	6,082,207	11	2,713,083	148
Machinery (Except Electrical)	18,527,714	14,963,331	23	6,112,584	303
Electrical Machinery, Equipment and Supplies	9,261,500	7,893,326	17	1,285,266	620
Transportation Equipment	45,730,500	44,040,889	4	10,433,333	340
Professional, Scientific & Controlling Instruments, Photographic & Optical Goods, Watches and Clocks	15,589,258	13,268,197	17	5,846,021	165
Miscellaneous Manufacturing Industries	1,494,500	1,444,741	4	182,734	720
Total & General Average	$207,384,188	$181,451,274	14	$56,190,889	270

Table IV. Textile Mill Products

(Average Ratio of Research Expenditures to Sales of Companies Who Have a Research Program Based on Replies Received)

Estimated 1947 Sales (in thousands)	No. Rptg.	1947 Ratio %	No. Rptg.	1946 Ratio %	No. Rptg.	1945 Ratio %	No. Rptg.	1941 Ratio %	No. Rptg.	1940 Ratio %	No. Rptg.	1939 Ratio %	No. Rptg.
$500, 750,	1	1.67	1	1.00	1	25	1	.50	1	1.00	1	1.43	1
750, 1,000,	3												
1,000, 2,500,	7	1.94	3	1.89	3	3.20	2	.02	1	15	1	09	1
2,500, 5,000,	3	.75	3	64	3	.58	2	.45	2	48	2	65	2
5,000, 10,000,	1	20	1										
10,000, 25,000,	5	76	3	36	2								
Over 25,000,	5	.57	5	.61	5	29	5	31	4	33	4	44	3
Not Reported	3												
General Average	28	.95	16	88	14	.93	10	32	8	40	8	45	7

Table V. Chemical and Allied Products

(Average Ratio of Research Expenditures to Sales of Companies Who Have a Research Program Based on Replies Received)

Estimated 1947 Sales (in thousands)	No. Rptg.	1947 Ratio %	No. Rptg.	1946 Ratio %	No. Rptg.	1945 Ratio %	No. Rptg.	1941 Ratio %	No. Rptg.	1940 Ratio %	No. Rptg.	1939 Ratio %	No. Rptg.
$50, 100,	1												
100, 250,	1	1.50	1	1.50	1	1.25	1	1.31	1	6.50	1	6.50	1
250, 500,	8	2.57	7	2.11	7	2.22	7	3.20	6	4.96	6	9.41	6
500, 750,	5	2.31	5	2.21	4	1.92	4	1.86	3	2.06	3	1.36	1
750, 1,000,	3	.99	2	10	1	.35	1			2.12	1		
1,000, 2,500,	14	1.38	14	1.46	13	1.48	10	2.30	7	1.74	5	1.99	5
2,500, 5,000,	11	1.78	10	2.14	8	2.06	8	1.71	8	1.97	8	2.40	8
5,000, 10,000,	3	1.41	3	1.13	3	.74	3	.65	2	92	2	97	2
10,000, 25,000,	8	1.88	8	1.94	7	1.75	6	1.47	6	1.84	6	1.93	6
Over 25,000,	14	2.05	9	2.21	12	2.22	11	1.29	10	1.63	9	1.64	9
Not reported	6												
General Average	74	1.83	59	1.87	56	1.83	51	1.72	42	2.35	41	3.17	38

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6. "Trends in Industrial Research and Patent Practices." National Association of Manufacturers (1947).

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- Fewer Ends Down!
- No More Heads to Jerk Out!
- No More Cylinder Trouble
- Less Vibration!
- Uniform Speed and Twist!
- Better Package-More Yarn!

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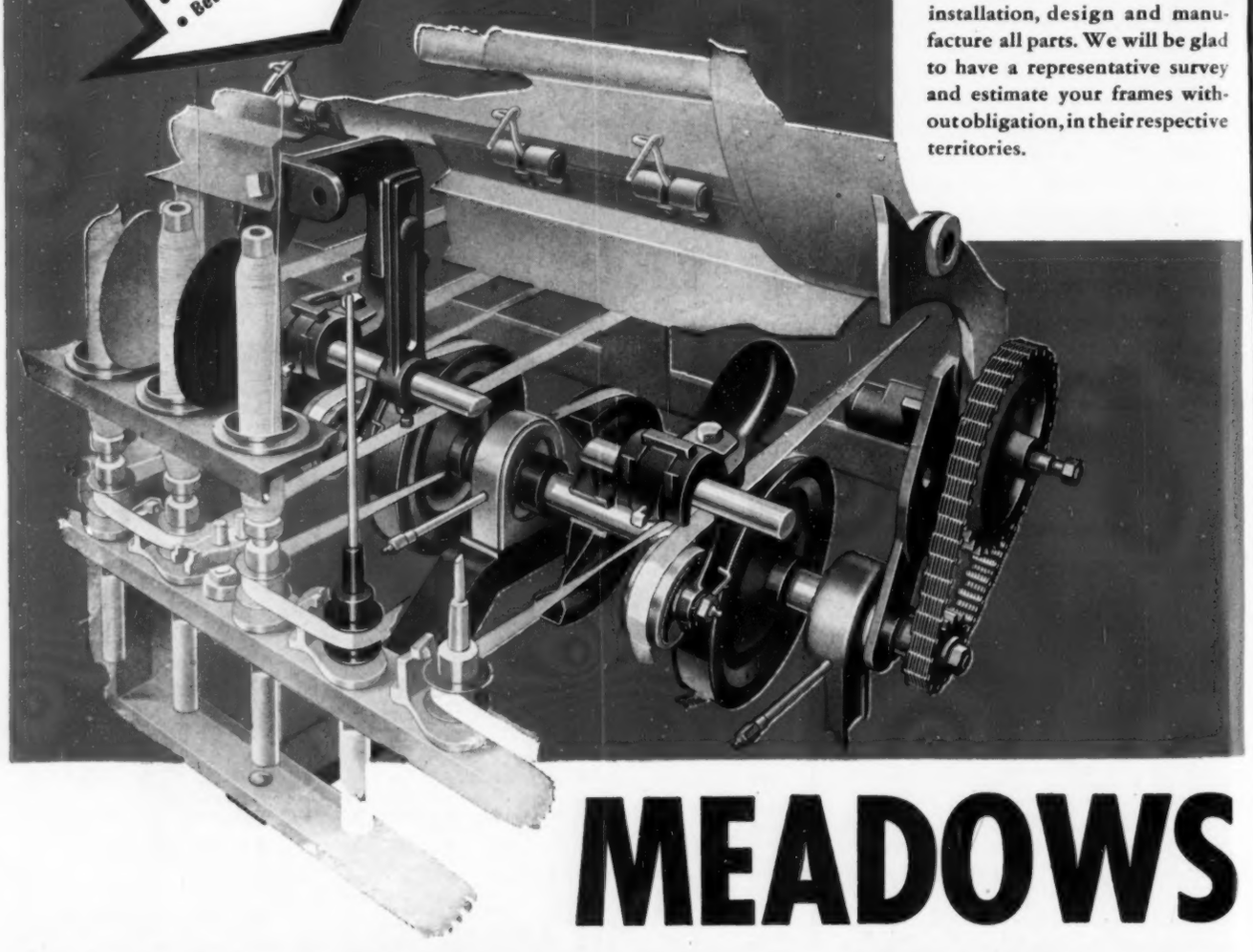

MEADOWS

MANUFACTURING COMPANY • ATLANTA, GA.

Progress In Materials Handling

By S. W. GIBB
General Sales Manager
The Yale & Towne Mfg. Co.,
Philadelphia Division

MATERIALS handling in textiles is as old as the industry itself, probably dating back to the time when the hand-weaving squaw called for another batch of filling, and another squaw tossed it to her. But efficient materials handling is a comparative newcomer to textiles.

Old-timers in the industry can remember when the weaver doffed a cut of cloth and carried or dragged it by hand to cloth room, or when the picker tender loaded a lap on his shoulder and delivered it to the card, or when several husky men struggled with section beams in loading the slasher. Even gravity conveyors were considered "gadgets" in the old days.

There was considerable interest in materials handling methods in textiles during and shortly after the first world war, at which time several mills went all-out on the installation of equipment. Examples are known where both southern and eastern mills made use of gravity and vertical conveyors, incline belts, and overhead rail equipment, but only a few carried the projects this far.

Interest in the subject waned as times became harder, and for awhile little or nothing was done to improve handling methods.

The NRA and Federal legislation, improved conditions, increased labor costs, and management's desire to improve operating conditions for the employees provided impetus to the materials handling movement. Today, materials handling is more than a trend—the industry is materials handling conscious, and is doing something about it.

The subject is too broad to be covered in one article; and all types of equipment are not included in this discussion, because in many instances the materials handling jobs are tailor-made engineering feats.

The accompanying story indicates some of the methods in practice today, most of which can be applied to existing textile organizations, and suggests principles as well as techniques of operation. Other examples of handling materials are given in the pictorial presentation.

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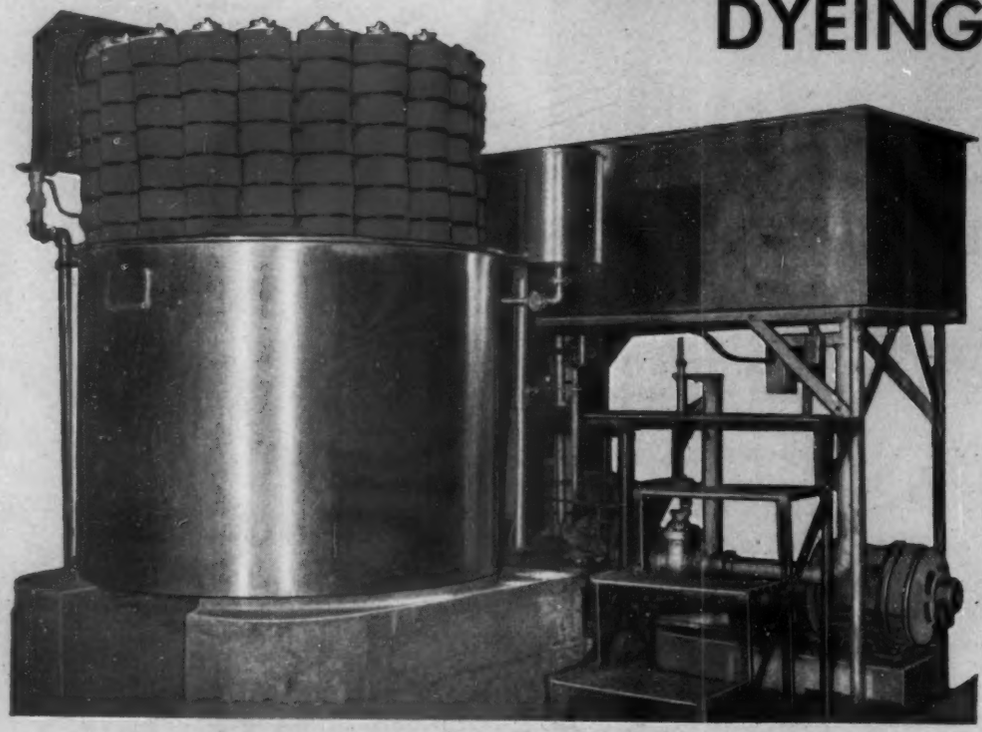

THE TREMENDOUS SAVINGS, AND PRESERVATION OF ORIGINAL QUALITIES IN RAYON CAKE DYEING OBTAINED WITH THIS MACHINE, ARE WELL KNOWN, AND SPEAK FOR THEMSELVES

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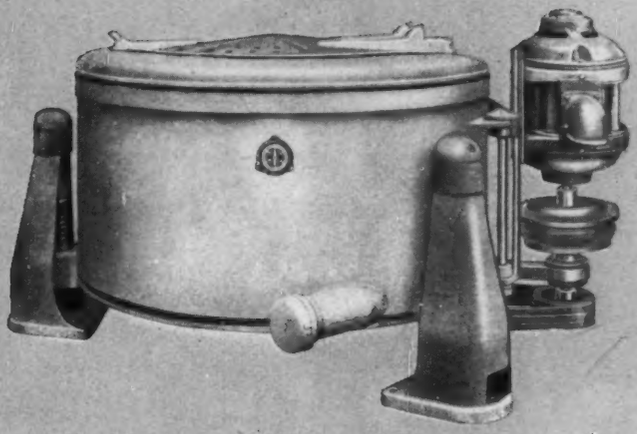

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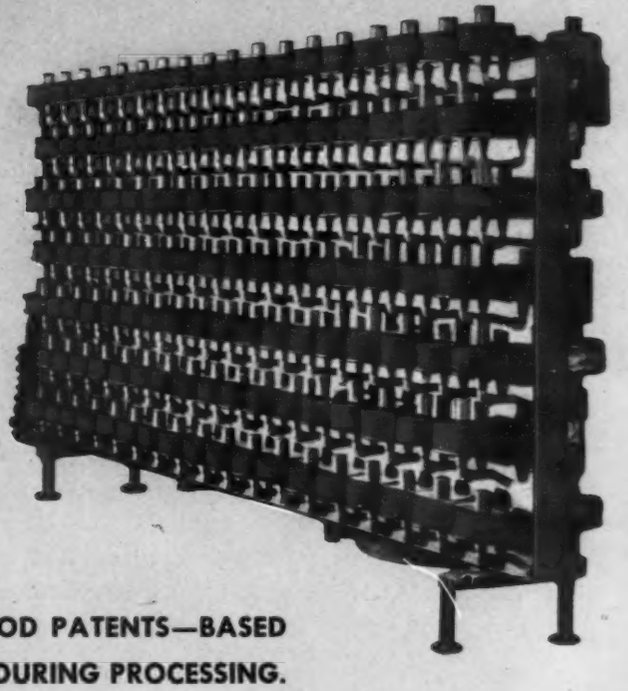
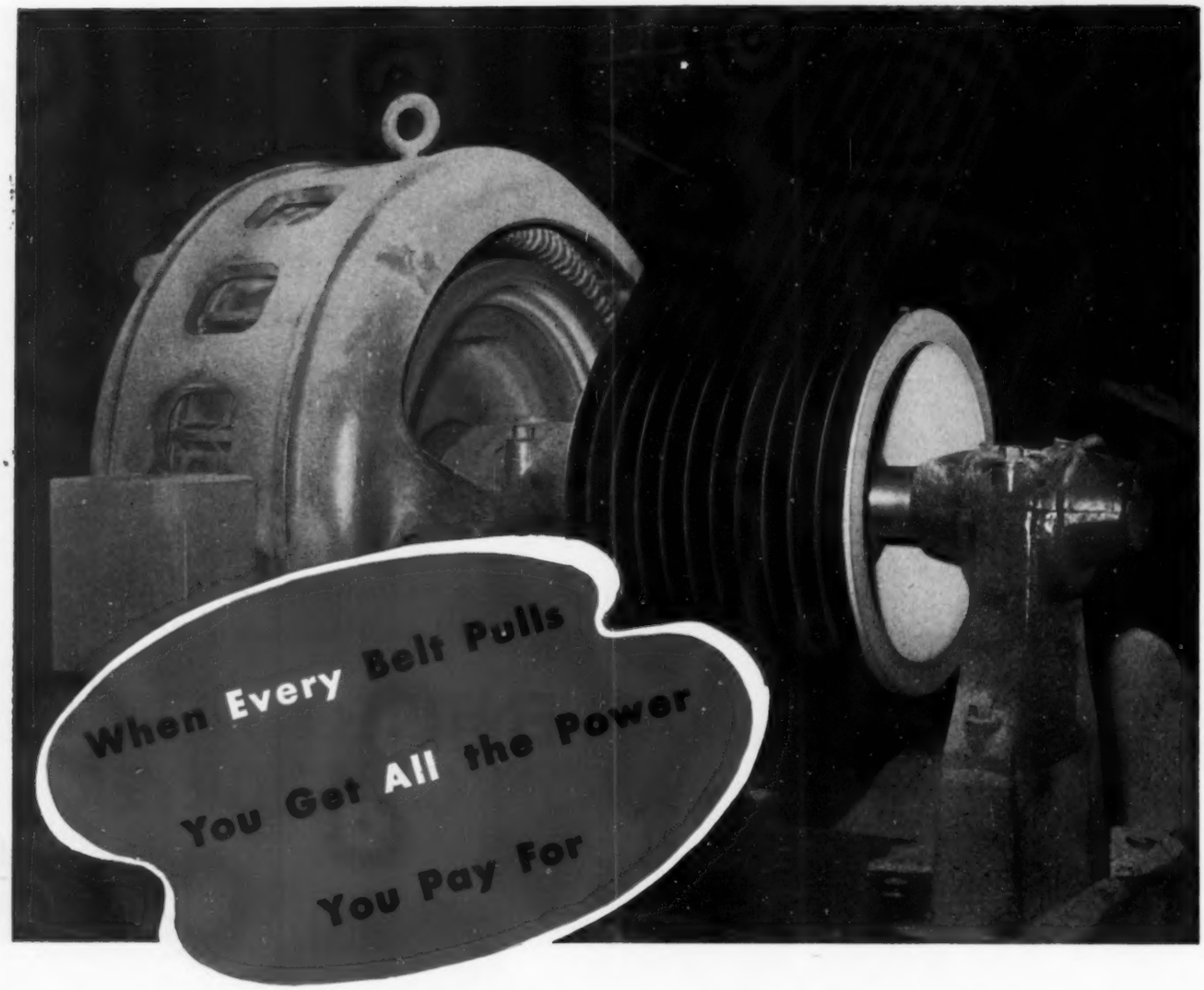


- THIS SUCCESS IS THE RESULT OF METHOD PATENTS—BASED ON A PREDETERMINED COMPRESSION DURING PROCESSING.
- PROVEN IN PRACTICAL OPERATION.
- STAINLESS STEEL CONSTRUCTION.
- MADE BY THE LEADERS IN THE FIELD.



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Uneven stretch in a multiple V-Belt drive overloads some belts while others ride slack. Power is lost and V-Belt life is shortened. Manhattan engineers have designed Condor Whipcord V-Belts to insure the most uniform team performance possible.

During manufacture, the stout Whipcord Strength Member, endless wound to form the load-carrying core of the belt, is pre-stretched. This Whipcord Strength Member is placed in the neutral axis area of the V-Belt and surrounded by heat dissipating, slow aging Flexlastics. Thus, the percentage of stretch is practically nil.

On your multiple V-Belt drives, every Condor Whipcord V-Belt wedges firmly in the sheave and delivers *all* the power you are paying for. Send for free engineering data applicable to your drives.

Manhattan's line of rubber products for Industry is consistently dependable—outstanding in quality. Make MANHATTAN your choice.

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Keep Ahead with Manhattan

MANHATTAN RUBBER DIVISION **PASSAIC, NEW JERSEY**

THE TEXTILE industry is currently exerting every effort *not* to handle materials—be they raw materials, materials-in-process, or finished goods.

The simple fact that handling adds nothing to the product but cost, points to one spot, if not the principal spot, where substantial savings can be made in the costs of production today. In the face of rising labor, material, and overhead costs, manufacturers are becoming intensely conscious of the amazing dollar-waste incurred in antiquated methods of handling materials.

In highlighting recent advances made in handling technique, it is felt that specific examples rather than generalities are most forceful. Therefore, typical cases of up-to-date handling technique in textile receiving, warehousing, processing, and shipping, have been selected and will be discussed in the light of savings which have been effected.

Inclined slat conveyor elevating bales of cotton.

Tailor-Made Applications. It should be borne in mind that each plant has its own detailed problems which require tailor-made solutions. However, such basic problems as loading carriers, tiering loads, traversing inclines, loading machines, negotiating narrow aisles, manipulating in and out of elevators, etc., are much the same in every plant and are attacked from a similar starting point. Moreover, the same principles apply whether the particular jobs performed are those of the mill, finisher, or converter.

The tips here given will no doubt spark a thought or two as to how the reader can make improvements in his particular case, but it is recommended that for maximum savings in time, space, manpower and money, an overall study of the flow of materials be made and improvement planned on a plantwide basis.

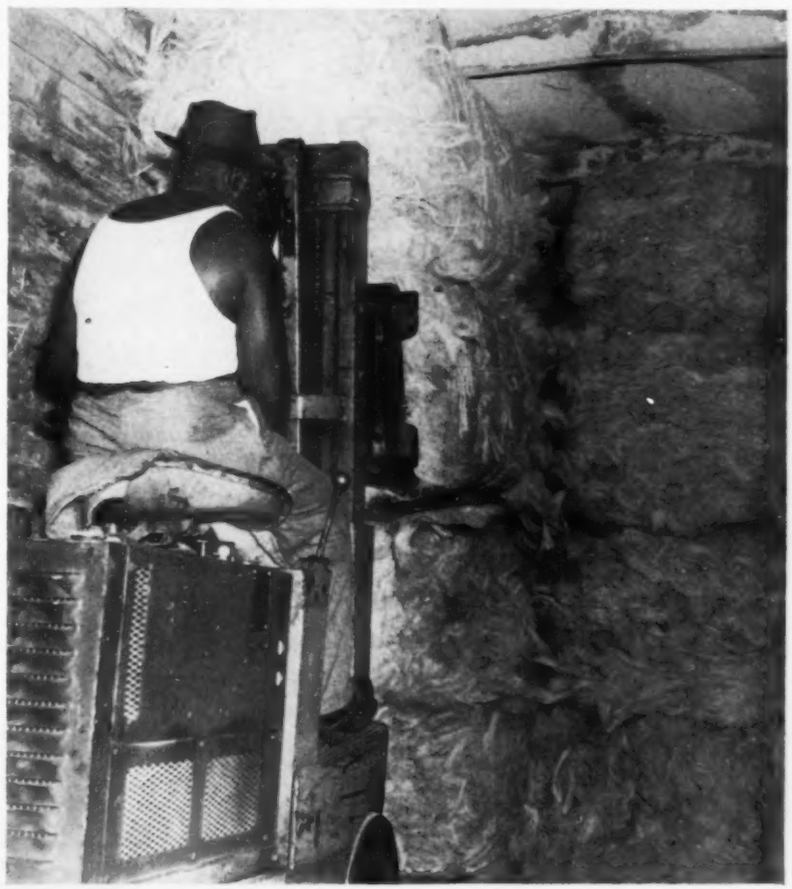
Materials Handling Study. In the last two years several systems have been developed for the production industries to use in making their own studies of their own particular "flows" of materials—from the receipt of raw stocks to shipment of finished goods—analyzing each movement, lift, placement, manipulation, stop or storage as regards speed, efficiency and cost. One of these systems offers analysis sheets, summary sheets, and instructions which are ready-made for showing up the weak spots in a system and indicating how to correct them.

But all of these systems for self-analysis — undoubtedly the biggest step forward which the materials handling industry has taken in the last few years—rely upon *one* decision by the user. We refer to his conviction, before he starts, that the subject is of sufficient importance to put the right manpower and brainpower behind the study.

It is strongly recommended that any plant contemplating a check-up on its overall system, hire a consultant, assign a top man, appoint a committee, or form a special department to make sure that the job is carried through *completely, carefully,* and *enthusiastically.* Any equipment manufacturer will help all he can, of course, but the real "steam" has to come from within.

Techniques. As for a few specific

Unloading bales from a freight car with a fork truck.



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- **FLOOR SPACE by 50%**
- **CAN COSTS by 50%**
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. . . and still maintain equal production

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Wouldn't you save money if you could increase available card room floor space, cut can costs and sliver deliveries in half and still maintain the same production and sliver quality? Of course you would. And you can do just that by installing Whitin Bi-coil drawing frames.

Oscillating can tables, a patented feature of the Bi-coil system, have successfully solved the problem of handling twin slivers. The sliver is free from twist due to the improved can motion and its quality is improved by the use of lower drafts. Bi-coil also provides easier creeling and cleaning for the operators. You'll find that Bi-coil Drawing is a factor essentially important to your mill investments.

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Whitin MACHINE WORKS

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CHARLOTTE, N. C. • ATLANTA, GA.

A tailor-made application of gravity and elevator type equipment. Doffer fills basket and places it on gravity conveyor. Basket is automatically lowered by elevator to spooler room two floors below.

techniques which will illustrate the type of progress being made, let us start at the beginning:

The problem of materials handling begins with the receipt of raw materials. The plant operator must unload his raw material from the carrier before he can begin his manufacturing operations. Generally, material is temporarily stored before being processed. Modern systems and equipment can effect considerable savings in these unloading and storage operations.

The fork truck has become popular for unloading bales from a freight car. The truck can enter the freight car, pick up bales without the aid of manual handling, transport the load to storage zones, and tier the bales to make economic use of overhead storage-room space. In this case, no pallets are used in handling the load. However, in handling cartons, drums, bags, boxes, etc., individual containers are usually stacked in lot sizes on pallets for most efficient transporting and tiering.

In transporting stock in process to the machines and in loading the machines, a wide variety of techniques can be used, depending pretty much on the material to be handled and the operations to be performed.

The fork truck can again be used in transporting sectional beams to scales, slashers, warpers, etc.

The fork truck, which is equipped with forks for regular duty, has been equipped with a transverse member slightly longer than the beams. This member is fitted at the extremities with downward sloping arms. The arms are notched at the end and engage the bar protrusions at the ends of the beams. By means of the special fork truck attachment, beams can be lowered from storage racks, carried to machines, and loaded into position for processing. Empty beams can similarly be returned to the racks. The racks, each holding two beams, can be lifted and transported by the same fork truck when fitted with standard forks. Removing the transverse member and applying the standard forks is a quick and simple operation.

Overhead materials handling equipment makes handling of section beams easier, safer, and quicker. Control of unit is accomplished by push button box shown in operator's hand.

The use of spur-gear trolley-

Many types of hand trucks are being found useful. Here one is used to transport bolts of cloth to temporary storage prior to shipment. The bolts are loaded on skids and the layers are cross-stacked to increase stability of the load. About 280 bolts can be handled on one skid.

CHEMICAL USERS' GUIDE To General Chemical Products for the Textile Industry

PRODUCT	AVAILABLE FORMS	COMMERCIAL STRENGTH (MIN.)	SHIPPING CONTAINERS	APPLICATIONS
Glauber's Salt, Crystal $Na_2SO_4 \cdot 10H_2O$ *(Sodium Sulfate)*	Colorless Crystals	96% $Na_2SO_4 \cdot 10H_2O$ 42.3% Na_2SO_4	Bags	Dyeing assistant.
Glauber's Salt, Anhydrous Na_2SO_4 *(Sodium Sulfate)*	White Granules	99.5% Na_2SO_4	Bags	Same as crystal but stronger product.
Sulfuric Acid H_2SO_4	Liquid	66° Be 93.19% H_2SO_4	Carboys Steel Drums Tank Trucks Tank Cars	Carbonizing wool; dyeing; desizing cotton; souring; rayon spinning bath.
Acetic Acid CH_3COOH + water	Colorless Liquid	Various	Carboys Barrels Tank Cars	Dye bath; souring agent; imparting scroop to cotton and silk.
Aqua Ammonia NH_4OH + water *(Ammonia)*	Colorless Liquid	26° Be 29.4% NH_3	Carboys Steel Drums	Wool scouring; dyeing.
Hydrochloric Acid HCl + Water *(Muriatic Acid)*	Liquid	20° Be 31.45% HCl	Carboys Tank Cars Tank Trucks	Souring; removing hypochlorite bleach; dyeing.
Tetrasodium Pyrophosphate, Anhydrous $Na_4P_2O_7$ *(TSPP) (Pyro)*	White Powder	98% $Na_4P_2O_7$ (Equiv. 52% P_2O_5)	Bags	Stabilizing peroxide bleaches; water treatment and dispersing agent; detergent.
Sodium Metasilicate $Na_2SiO_3 \cdot 5H_2O$	White Granules	29.0% Na_2O	Bags Fibre Drums	Kier boiling as detergent.
Sodium Sulfide Na_2S + water	Red Chips or Solid Mass	60% Na_2S	Steel Drums	Dyeing with sulfur dyes; depilatory for wool pulling; desulfuring rayon.
Sodium Sulfite, Anhydrous Na_2SO_3 *(Sulfite)*	White Powder	98.5% Na_2SO_3	Bags Fibre Drums	Rayon manufacturing.
Sodium Bisulfite, Anhydrous $Na_2S_2O_5$ *(ABS) (Sodium Metabisulfite)*	White Powder	97.5% $Na_2S_2O_5$ (Equiv. 65.5% SO_2)	Fibre Drums	Bleaching wool; anti-chlor after bleaching with hypochlorite; rayon manufacturing.
Oxalic Acid $C_2H_2O_4 \cdot 2H_2O$	Colorless Crystals	99.5% $C_2H_2O_4 \cdot 2H_2O$	Fibre Drums	Bleaching; dyeing; for mordanting wool with chrome.
Ferric Sulfate $Fe_2(SO_4)_3$ + water *(Iron Copperas Nitrate)*	Liquid	47° Be 11% Fe	Carboys Barrels	Silk weighting; mordant.
Ferric Nitrate $Fe(NO_3)_3$ + water *(Iron True Nitrate)*	Liquid	43° Be 47° Be 10% Fe 11% Fe	Carboys Barrels	Silk weighting; mordant.

OTHER PRODUCTS: Disodium Phosphate; Nitre Cake; Sodium Silicate; Trisodium Phosphate; Sodium Hyposulfite; Aluminum Sulfate; Lead Acetate; Mixed Acid; Epsom Salt; Chrome Alum; Aluminum Chloride; Ammonia Alum; Potash Alum; Ammonium Sulfate.

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mounted chain hoists is also quite common. By mounting the hoists on an overhead I-beam they can transport material from one operation to the other or from department to department. By using more than one hoist to an I-beam, time is not wasted in waiting for one hoist to be free.

When using this type of equipment, a bar, equipped with a center eye and a length of chain at each end, is used to handle rolls of cloth. The hoist-hook is attached to the center eye and the chains are secured to a second bar inserted into the wooden roller on which the cloth is wound. This system greatly decreases the manual effort required in picking up, transporting, and positioning rolls of cloth.

Many types of hand trucks are being found useful. One type of truck is used to transport a special skid-rack which carries six rolls of cloth instead of the usual one. The skid load can be deposited where needed, and the operator is free to transport additional skid loads.

Another application of a hand truck is in transporting bolts of cloth to temporary storage after they have been finished. The bolts are loaded on skids and the layers are cross-stacked to increase the stability of the load. Using this system about 280 bolts can be handled on one skid.

Electric hoists permit the operator to lift heavy loads by merely pressing a button. This saves time and energy.

Another example of the use of an electric hoist is applied in a shipping operation of a rayon plant. In this case the hoist is stationary-mounted and provides a simple method of lowering loads to the floor below. The hoist is controlled by a bar-grip control; by pulling down on one end of the bar-grip the hoist lowers, and by pulling down on the other end, the hoist lifts.

A new type of fully-powered handling tool is the handle-guided, electrically-driven lift truck. It can handle loads weighing up to 6000 pounds. It makes the operator's work easier as he merely guides the truck. The small size and light weight of this type of power truck adapts it for such jobs as loading street trucks, riding elevators, manipulating narrow aisles, and negotiating inclines.

One feature of this type of truck is that it can be adapted for use in handling both pallets and skids. This adaptation was designed for use in plants which: (1) are converting from skid-type handling to pallet-type handling, but want to continue to use existing skids; (2) have one type of system but must receive and ship some goods by the other system to conform with suppliers' or customers' handling systems; and (3) use both pallet and skid systems within the plant.

The foregoing are a few typical examples of handling operations as carried out by various segments of the textile industries, and which show progress by the industry.

Before analyzing material handling in your plant it would be well to have in mind the basic principles of efficiency in materials handling—recently developed by the National Paper Trade Association, and one of the clearest "common sense" lists of do's and don'ts we have seen in a long time; these are given in the accompanying box. Merely by putting these principles to work in an intelligent and coordinated way, the textile industries can tap extra sources of revenue.

BASIC PRINCIPLES OF MATERIALS HANDLING

1. Economy in moving materials is obtained by **not** handling them. Eliminate all handling operations except those which are absolutely necessary.
2. Combine operations whenever practicable to avoid handling or transportation from one operation to the next.
3. Use gravity for relatively inexpensive transportation whenever possible.
4. Use mechanical assistance to the widest extent practicable.
5. Provide continuous or appropriately intermittent flow of work in order to prevent stock from piling up in order to keep handling equipment at a constant level of operation.
6. Lay out definite routes of travel to avoid congestion and unnecessary shuffling of equipment and materials.
7. Avoid low-cost handling at one stage, which causes high-cost handling or unnecessary rehandling at another. Low overall handling cost is the goal.
8. Install standard equipment which has demonstrated its effectiveness. Use special equipment only under special circumstances.
9. Buy equipment for overall savings, not first cost, and be sure that the equipment actually can be used in all the operations for which you are buying it. The investment must be justified by the savings after deducting all fixed charges and expenses related to it.
10. Provide for alternate methods in case of breakdown.
11. In loading, unloading, or transporting operations, handle material in as large a unit load as practicable.
12. Avoid transfer from floor to conveyance or vice versa, and from conveyance to conveyance when this involves handling in small units.
13. When storing materials, stack as high as practicable to obtain most efficient use of floor space. (Do not interfere with full flow of water from sprinkler heads, however.)
14. Provide suitable running surfaces and clearances for self-propelled materials handling equipment.
15. Avoid "empty-handed" movement of warehousemen, conveyances, and elevators. Provide for return trip loads as much as possible by proper scheduling of materials flow into and out of stock.
16. Remove all operating hazards in methods and equipment to prevent accidents.
17. Provide instruction so as to train workers, old and new, in the most effective use of equipment and its maintenance.
18. Place the responsibility of handling and transportation under one person.

In Retrospect

(Textile Industries, December '11)

A cloth inspector must be a man who is not afraid of hurting the feelings of any one. I have seen overseers of weaving go to the inspector and ask him not to lay out every little bad place, as the superintendent was already complaining to him of his bad cloth, and that there had been a lot of bad warps from which he could not possibly make good cloth.

FROM 1,768 LOOMS . . . .

544 more yards per hour!

Hunt SPREADERS

PATENTED HUNT SPREADERS GIVE 11% LOOM SPEED INCREASE TO BIG SOUTHERN MILL!

Installation of Hunt Spreaders and an overhauling job done right on the weave room floor in a North Carolina Mill* have made possible 11% increase in operating speeds of 1768 looms. Weaving 80 x 80 goods this increased speed would give 544 yards greater output per hour for the 1768 looms!

Amazing, you say . . . and it is indeed amazing.

And yet, results equally gratifying are being reported from Hunt Spreader installations in many, many other mills in all parts of the industry.

The patented Hunt Spreader assembly braces and strengthens the loom frame, adds extra bearings to crankshaft and camshaft. It is made in sizes to fit practically any loom. Hunt's skilled erectors can make installations easily and quickly on your floor, with a minimum of interruption to present operation.

Have you considered the advantages of adding Hunt Spreaders to looms in your weave room? Would you like specific information about cost and availability? If so, please write, wire, or phone us.

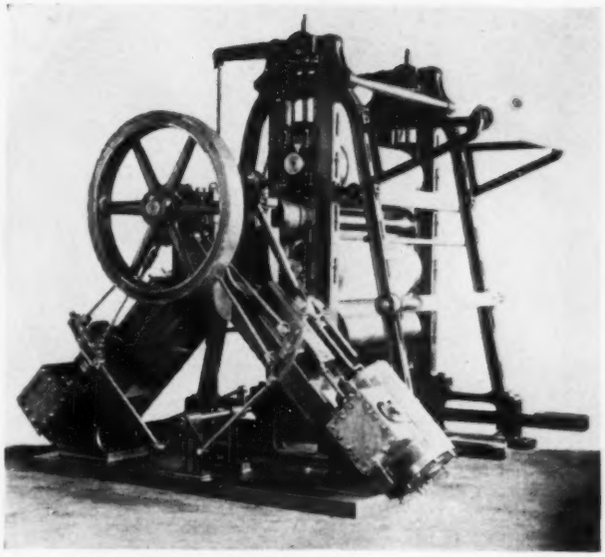
Plan now to attend the Southern Textile Exposition in Greenville, S. C., October 4-9, 1948. Hunt Spreaders, Hunt Certified rebuilt looms, and other Hunt textile machinery improvements will be prominently displayed.

*Name of mill on request.

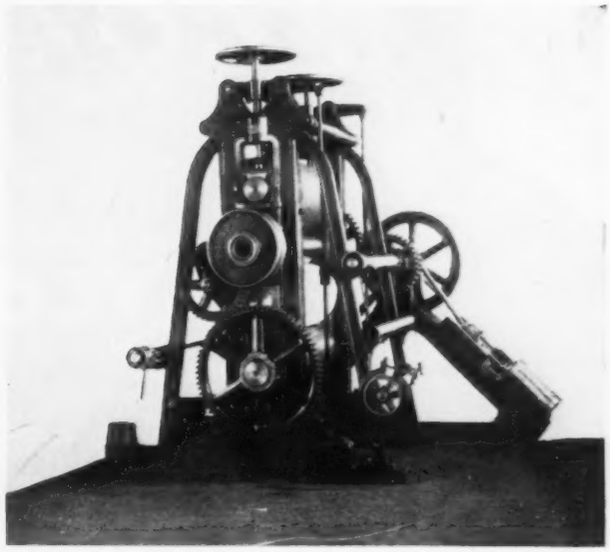
HUNT MACHINE WORKS, Inc.

200 ACADEMY STREET TELEPHONE 2-5681

GREENVILLE, SOUTH CAROLINA



Early type 5-roll rolling calender with steam drive.



Three-roll friction calender in use about 1900.

50 Years of Progress in

Dyeing, Bleaching, and Finishing Equipment

By H. W. BUTTERWORTH, JR.
President, H. W. Butterworth & Sons Co.

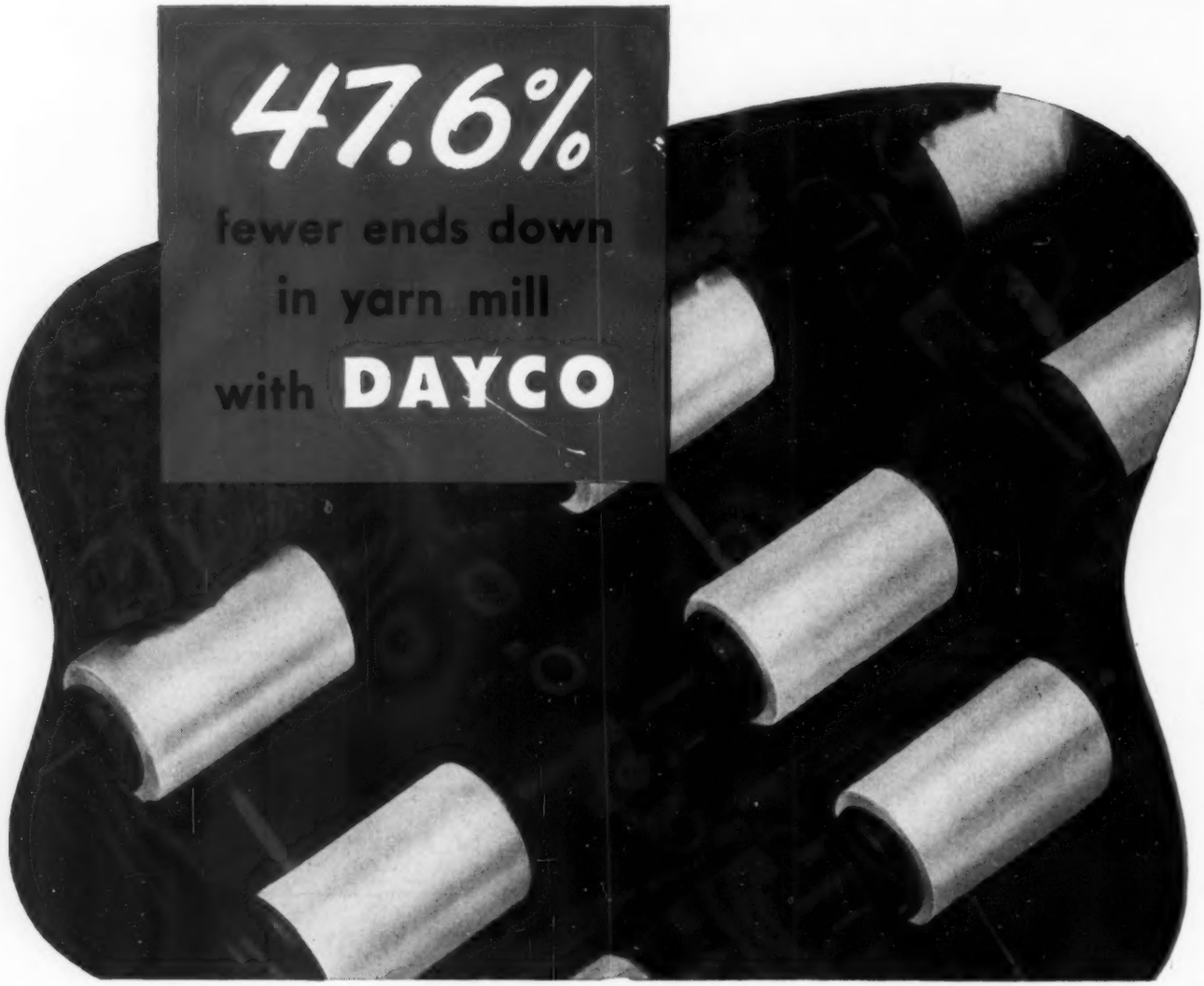
THE WET END of textile finishing came of age in America during the period of great industrial expansion which began about 1900. Vast improvements in production procedures, coupled with the contributions of the engineer, the chemist, the metallurgist, and the electronics expert, have enabled the manufacturers of bleaching, dyeing, and finishing machinery to design equipment whose speeds and precision dwarf those operating at the end of the gay nineties.

The elimination of many separate processes, the combining of others, and the constant growth during this era toward continuous range production have created higher quality output and also lowered unit costs in finishing.

Ranges driven by water power, singers heated by a coal fire, mercerizers produced 150 lbs. per day. Both the old and new are discussed.

Debut of Automatic Tenter Clamps. Turning back to the opening of this century and scanning the history of this industry we find that the various bleaching, dyeing, and finishing processes were performed largely on individual machines which (1) required plants with large floor space, (2) kept down operating efficiency, and (3) made work hazards to both men and fabrics high.

There were, however, some crude tenter finishing ranges known as "automatic chains"



In a large yarn mill in central North Carolina, a test, run on 264 spindles equipped with *Dayco* Roll Coverings and 272 spindles equipped with a competitive make, the competitive roll coverings caused almost twice as many ends down, per thousand spindle hours, as did the *Daycos*.

As in many other tests, conducted under actual mill operating conditions, *Daycos* outperformed the competitive roll coverings by a wide margin . . . in this test . . . with 47.6% less ends down. To insure a fair test, both makes of roll coverings were run under identical circumstances of frame condition, temperature and relative humidity, and with the same kind of yarn.

Daycos outperform all other roll coverings in test after test, because they are built with exactly the right amount of cushion and the correct coefficient of friction to assure perfect drafting properties. Too, *Daycos* are not affected by temperature or humidity, which means their superior physical properties will remain constant throughout their long service life. In fact, the characteristics of *Dayco* Roll Covering are such that *Dayco's* surface drafting properties improve with use.

You can prove these things to yourself by trying *Daycos* on your frames. For complete information, write *Textile Products Division, The Dayton Rubber Company, Woodside Building, Greenville, S. C.*

Write today for your free copy of Dayco's new Cot Grinder bulletin, No. A-550.

Dayton Rubber

THE MARK OF TECHNICAL EXCELLENCE IN NATURAL AND SYNTHETIC RUBBER

which made their debut in 1898. Only the advanced plant of that day had this type of equipment.

These tenter ranges had a very light starch mangle at the entering end. They were almost always driven by side shafts connected to the drive end of the tentering machine. In some cases these early ranges contained a small cylinder drying machine, usually driven by cones from the starch mangles.

Such ranges were operated at low speeds and were powered for the most part by steam engines. When mills were situated by rivers and streams, the ranges were driven by water power. It was considered that a high rate of speed had been achieved when cloth passed through these machines at 40 yards per minute. Speed changes were largely obtained through cone pulleys.

Maple Rolls. Many of the processing machines, such as the starch mangels, powder filling mangles, and various dyeing machines, were equipped with maple rolls, although the use of rubber and bronze covered rolls was not uncommon by this time. Pressure used on these machines was light, and the rolls were usually of small diameter. Maple rolls were used almost universally on bleaching machines and presented many disadvantages due to their natural tendency to dry out and crack, and because of their color absorbing qualities.

Coal Fire Singers. The singeing machine of this decade was so constructed that the unfinished cloth passed over a copper plate which was often heated by a coal fire. Its motivating power, like many other machines operated by steam, was derived from a 4 by 5 angle engine. It was not until later that the oil singe and then the gas singe were developed. It was during the first decade of this century that pin plates on the "hot air" tenters were superseded by the advent of automatic tenter clamps which for the first time effected mechanical clipping of the selvages as they entered the frame and their automatic release at the end of the journey.

Mercerization Begins. The year 1898 marked the beginning of mercerization on a commercial basis in the United States. The first skein and warp machines were of small capacity (approximately 150 pounds per 10-hour day) and were highly experimental. Yet only nine years later mercerizing machines were being built with capacities ranging from 7,500 to 10,000 pounds of skein per day.

In one early machine, the yarn traveled spirally about a drum and down through the caustic into a tub, traversing around three rollers. The movement was similar to that in rope-washing machines employed in cotton cloth bleacheries. The caustic was kept at 55° Twaddle, and the temperatures were maintained at 40° F. To insure this, a false jacket filled with ice surrounded the caustic tub.

The yarn in its travel, was immersed from two to three minutes in the caustic. The tension was supplied by the strength of the yarn on the drum. It then passed through the rollers and another section where it was washed, scoured, and then washed again.

The fundamentals of mercerizing have changed but little in the last 50 years. The progress that has been made is in perfection of equipment to speed processes and improve the quality of production. It should be noted that in the early days seconds ran to 20 per cent or higher.

Introduction of Electrical Power Drives. The period from 1910 to 1920 was marked by the wider use of electricity as an industrial power source. After the advent of the first electrical motors, usually operating on direct current, manufacturers of machinery soon adapted them to a wide selection of individual and range operations.

During this decade rubber covered rolls were applied to a wider range of machines, replacing the use of maple. Today rubber is used in every type of textile process because of its ability to withstand chemical action and to retain resiliency. Modern treatments of rubber prevent surface hardening and keep the rolls from changing density while in storage.

By 1920 the improvement of electrical motors made possible speeds which were heretofore only envisioned. However, the new speed potentials created mechanical problems which had to be solved by advanced engineering.

Practically all the machines up to this time had been built with plain bearings. The older equipment usually contained bearings of babbit or bronze. These older bearings wore excessively under the friction and strains caused by the new speeds.

The development of various types of anti-friction bearings followed. Constant improvements of these bearings during the last quarter century have led to ever increasing speeds. Side by side with these developments, research has produced the necessary lubricants, new drives, and mechanical and electronic controls.

Chemist and Fabricator Cooperate. At the same time cooperation between the machine fabricator and the chemist also grew closer during the twenties. The class of colors used then, and still most widely used, was the vat group. The padding of vats with pigments before jigging was a standard practice. As specking was a major dyehouse problem, it was necessary to use either a protective colloid or some dispersing agent.

Although a large volume of vats were in use at this time with continuous dyeing machines for coloring with indigo, it was not until then that continuous dyeing for all vat colors was inaugurated.

Various mechanical problems arose as a result of the common procedure of padding a reduced color and then passing the cloth through a booster solution. To overcome the difference in exhaustion rates of the reduced vat colors, machine manufacturers used smaller pad boxes, greater squeeze pressures, and decreased immersion time.

Printing Replaces Many Yarn

SLIX

Trade Mark of the original product for separate application of a warp lubricant.

Weaving performance tests on cotton and spun rayon, conducted by a number of the country's leading textile mills, have proven that the separate application of SLIX materially reduces both warp and filling stops.

● **Results of these tests, and other technical information regarding the patented application of SLIX, appear in illustrated bulletin, "Developments in Warp Sizing," available upon request.**

SOUTHERN SIZING COMPANY

INCORPORATED 1930

POST OFFICE BOX 167
ATLANTA 1, GEORGIA

•

POST OFFICE BOX 128
EAST POINT, GEORGIA

Dyed Fabrics. Machines for the printing of fabrics were made prior to the Civil War. Wider use of machine printing occurred during the late twenties. This was made possible by the very successful production of colors which were fast to light and washing.

With acceptance of printed materials, especially as applied to more expensive fabrics and also to silk and rayon dress goods, many popular fabrics which previously had been made of dyed yarns were replaced. For instance, shirtings, pajama cloths, and certain types of linings which used to be made with yarn dyed warp threads now were made with a vat stripe. The machines of today print as many as 14 colors.

Use of New Non-Corrosive Metals. The '30's introduced stainless steels and other non-corrosive metals which were used to great advantage in the manufacture of such equipment as dye becks, package dyeing machines, drying cylinders, tanks, tub compartments, and tenter clamps. These new metals, which did not absorb the color dyes, eliminated the boiling out procedure necessary on the old wooden vats and older type kiers and substituted a water flushing procedure.

The use of stainless steels and other new metals of similar nature made it possible for a light shade to follow dark shades without fear of either graying or getting off-shades. As a result, economy of equipment was achieved, and the previous time lost between runs was eliminated. It became possible to change from green to white in a matter of minutes, whereas when wood or corrodible tanks were used, it oftentimes took hours and even days.

These new products created freedom from warpage, corrosion, and other deterioration of the metal. Manufacturers were able to use new processes, such as welding to eliminate bolts, etc., which gave the finished machinery new strength and durability and eliminated fabric tears and many cleaning operations.

Today there are some 50 different kinds of corrosion-resistant metals.

Steady Growth of Sanforizing. Great interest in the patented process, "Sanforizing," which predetermines and obtains the amount of shrink desired, was evident in the early thirties.

In 1932, machines for preshrinking were developed which could handle various types and weights of cloth ranging from 2 to 5 yards, and it was possible to shift from one class of goods to another without any adjustments to the machine other than the usual gear, spray, and width changes necessary for obtaining the desired shrinkage results.

Since the advent of Sanforizing the entire textile industry and the general public have become "shrink conscious" when thinking about fabrics.

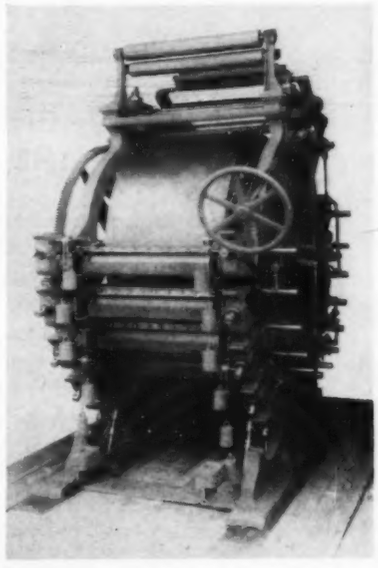
Knit Fabrics Included in Range Processing. Continuous processing, drying, and finishing of knit fabrics was introduced in the thirties. The development of new machinery enabled one unit to extract and process both tubular and warp knit goods. The machine handled cotton, rayon, woolens, and mixtures at speeds up to 40 yards per minute.

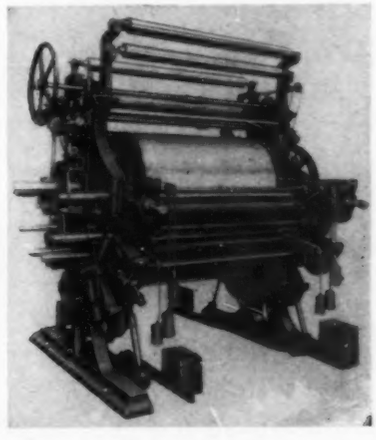
This was achieved by the arrangement of an internal belt conveyor which put each stitch into the same alignment as when it left the knitting machine. The fabric was steamed while free of tension and cooled prior to being rolled. The machine, operated by one man, contained a double steaming arrangement and an adjustable pressure mechanism on the calender rolls, making possible quick change in pressure as well as complete roll separation.

The new machine placed in range enabled two operators to extract, process, dry, finish, condition, and measure in a continuous operation. An average 100-yard roll could now be passed from the soaking wet to the finishing stage in from three to five minutes.

In the years immediately preceding the World War II, it should be pointed out that the average textile manufacturer was attempting to satisfy the trade with obsolete machines and was endeavoring to overcome his facility deficiencies by increasing production of so-called standard lines. In 1940, one survey showed that "64 per cent of equipment in use in the wet end of textile finishing cannot operate at a profit in competition with modern high speed machines."

The war emergency, the conversion to war production, forced many outmoded plants to re-tool, re-equip, re-staff, and to pool all types of information. The result was production of many types of new machinery using facilities





There has been very little change in the design of printing machinery. At left is a printing machine used about 1900. Below, a modern Butterworth 6-color machine is shown.

Research at work

TO BRING YOU MORE

A Westinghouse Research Engineer studies the results of design changes for improved bearing lubrication. Constant fundamental research and experimental activities such as these, combined with the work of specialized engineers, account for the many Westinghouse contributions to the Textile Industry.

HOW WESTINGHOUSE RESEARCH BENEFITS THE TEXTILE INDUSTRY

Westinghouse research has made many contributions to the Textile Industry. These developments are the natural outgrowth of a *working* partnership, formed at the time of the early beginnings of mill electrification.

More than 50 years of Westinghouse textile experience is behind each development. From the new multi-motor slasher drive to *Precipitron, the electronic air cleaner—Westinghouse offers related equipment to step up production through better and healthier working conditions . . . uniform quality . . . with lower maintenance per dollar invested.

You'll be assured of *practical* and *economical* answers to your textile problem by calling your nearest Westinghouse office . . . or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-94756

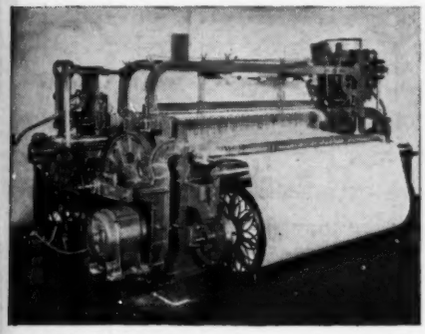
*Reg. Trade-Mark

PRODUCTIVE POWER

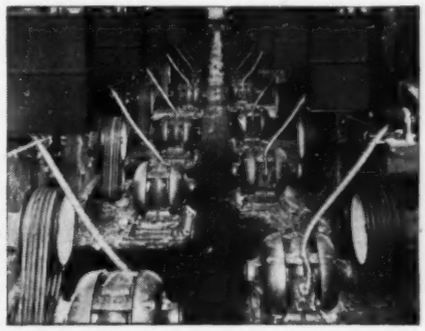
WESTINGHOUSE RESEARCH HAS ONE GOAL: TO HELP YOU PRODUCE FASTER, CHEAPER, BETTER, ELECTRICALLY

New ideas, new processes, new material for making electrical power more productive, flow steadily from the famous Westinghouse Research Laboratories. Many of these developments are at work now in *your* industry...developments—in electricity, in electronics, in processing—which promise many new advancements to help you produce *faster, cheaper, better,* electrically.

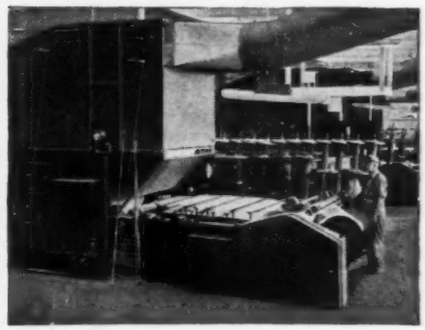
This broad basic research is an important added value to consider when you buy electrical equipment. A complete, separate Westinghouse Textile Industry Department, staffed by engineers intimately acquainted with Textile Industry problems, assures the prompt and *practical* application of new Westinghouse research developments to your special production techniques. Here are 6 Westinghouse contributions to the Textile Industry:



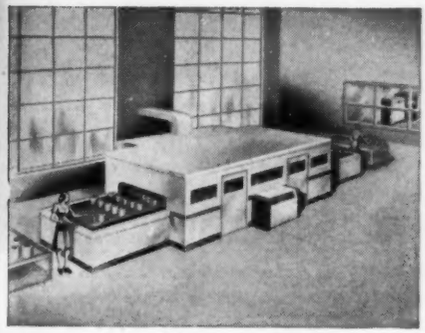
LOOM MOTORS—Quiet, cool, smooth-running motors that cut down radiation heating of your weave rooms—especially designed for peak output. This 1½ hp loom motor drives a modern woolen and worsted loom.



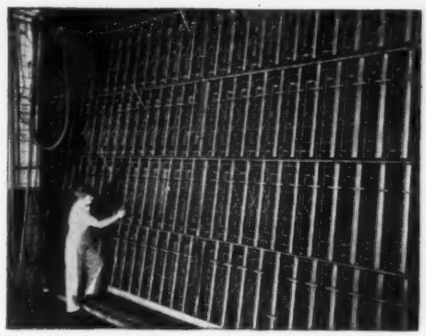
LINT-FREE MOTORS—"The cleanest running motor for textile service"—keeps its insides free of lint because it has *smooth* contours in the path of air circulation. These Westinghouse Lint-Free Motors drive spinning frames at high speed.



MULTI-MOTOR SLASHER DRIVE—The first major improvement in slasher drives for several decades. Rototrol is built into the system to guarantee uniform tension control . . . provides uniform yarn tension—diameter—beam density—better filler yarn spacing, less breakage, more warp on beam.



RADIO-FREQUENCY HEATING—Cuts twist setting and drying time, cake drying and dye package drying to a fraction of that required by conventional methods. Shown is a typical rayon dryer. Note control station at front of dryer.



PRECIPITRON—Keeps air clean and healthy—no "mill room fever"—picks out air-borne particles as small as 1/250,000 inch—eliminates dust, lint, soot, fumes, oil mist and smoke from the spinning, winding, weaving and drying operations—increases top-grade production.

LIGHTING—Modern fluorescent lighting provides maximum "see-ability" in this textile mill. Westinghouse "planned lighting" is added proof of the value of single-source responsibility.

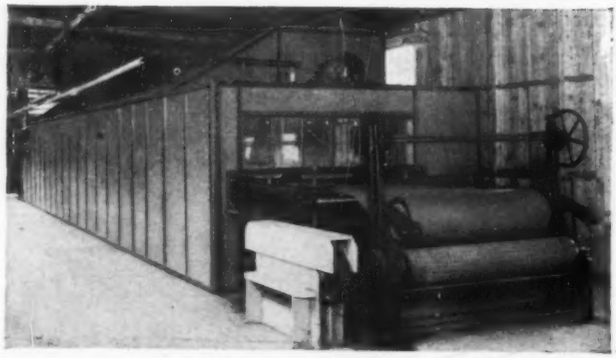
Westinghouse

PLANTS IN 25 CITIES... OFFICES EVERYWHERE

MORE PRODUCTIVE POWER FOR INDUSTRY

Progress?

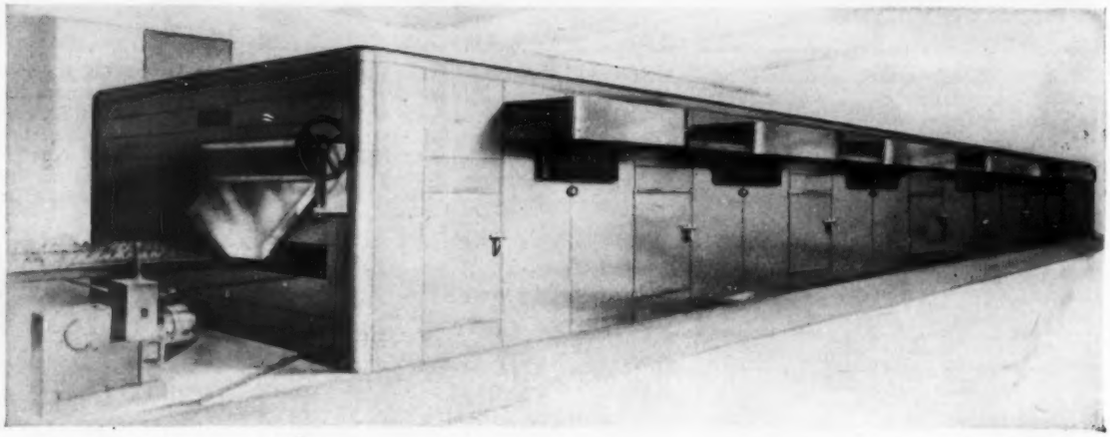
HERE'S JUST *ONE* "NATIONAL" ADVANCE DURING RECENT YEARS



The Old...

An early "NATIONAL" Tenter Dryer that superceded all previous standards for drying speed and efficiency. Subsequent improvements in design and construction have continued to assure "National" leadership. Today, in the Model SR-4, results never before accomplished in the history of tenter drying are regularly recorded.

The New



"NATIONAL" SR-4 TENTER DRYER. Styled to accentuate its superiority over less modern dryers . . . in efficient, trouble-free operation; greater drying capacity per lineal foot of frame; longer service life; lower drying costs. A high-powered, flexible machine that gives up to *twenty times greater production* than is possible with other types of tenter dryers.

Progress IN OTHER "NATIONAL" MACHINES

Like the SR-4, other "NATIONAL" dryers offer all that is new in speed, efficiency and profitable operation. Automatic Piece Goods Dryers; Print Goods Dryers; Stock Dryers; Swatch Dryers; Test Dryers . . . *all* have advantages you can't afford to overlook.

WRITE FOR ILLUSTRATED LITERATURE

Folders, booklets and other material completely describing the SR-4 and other "National" machines will be sent promptly, or we will gladly have our representative call at your convenience.

NATIONAL

LEADERSHIP THROUGH PROGRESS
IN SERVICE TO A GREAT INDUSTRY

THE NATIONAL DRYING MACHINERY CO.
N. HANCOCK ST. & LEHIGH AVE., PHILA. 33, PA.

not required for war production.

Advances Made During Last 7 Years. Forced by war-born necessity, the manufacturer of bleaching, dyeing, and drying machinery has made great strides during the last seven years. Out of the new cooperation created between the engineer and chemist, the electrical and metals expert, new functions for older equipment have been created, and both new processing ranges and new chemical processes have been achieved.

New electrical controls, motors with adjustable speeds, and special coordinating equipment for textile finishing has brought about greater range operations in both cotton finishing and the processes used for the recently developed synthetics.

Refinement and new developments in instrumentation have eliminated many separate steps in processing. Regulators, controllers, and timing devices adjust sequences in dyeing and scouring operations. Predetermined temperatures can be reached at exact intervals, and such temperatures can be maintained or lowered either manually or automatically.

Yet, despite these many improvements there are many plants which could by no stretch of the imagination be called modern. Surveys made during the war emergency disclosed that most of the key production machinery then in use had been in service more than 10 years, many were 20 years or older, and there was a sizeable proportion that had been in operation since the turn of the century.

During the war years these machines were run for long hours and at maximum speeds, and while it is possible to maintain and repair such equipment, it should be pointed out that as time goes on it will be difficult for plants erected prior to 1935 to compete successfully with the modern and efficient plants being constructed today.

Continuous Peroxide Bleaching. The cooperation of the chemist and the engineer has resulted in the development of successful continuous bleaching ranges. While the new process was innovated commercially just prior to the war, it was perfected during the war years and contributed materially to producing urgently needed fabrics required by the war effort.

Continuous "J" box bleaching is a simple process and is usually carried out in two stages in large piece goods bleacheries. The first stage is a preparatory treatment in which goods are impregnated with caustic soda. The second is that of bleaching.

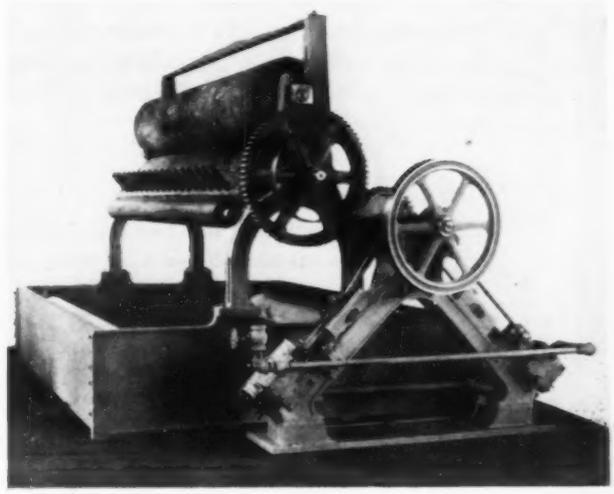
The process is widely used to bleach materials such as cotton piece goods and yarns. Two variations of the process are in use. In most cases the rope system is utilized because cloth handling in this form is easier and higher operating speeds can be obtained. However, on heavy goods that are bleached before dyeing, care must be used to prevent crease marks, and for this type of work open width equipment is used. The sequence of operations in both systems is the same, the difference being only in the cloth handling.

Enormous savings are achieved with the continuous bleaching systems. Comparing these systems with the old kier boiling method we find on the basis of a daily production of 25 tons of 5-yard goods that 25 per cent less floor space is required, that labor and chemical costs are reduced as much as 40 per cent, and steam consumption by 75 per cent. The new processes reduce from 20 to approximately two hours the time for the first yard of goods to be processed. Two 3,000-lb. "J" boxes replace six four-ton kiers. These figures vary slightly, depending upon the weight and construction of the cloth.

Continuous Bleach for Knit Goods. In 1947, new tension controls were developed which made it possible for the first time to bleach knit goods in a continuous bleaching range. At every step in the knit goods bleaching operation, tension is minimized and there are special piling and tension devices in the high speed slack washer. In addition, special piling and folding mechanisms have been incorporated in the design of the streamlined "J" box.

It required only 44 feet for a complete high production bleaching range for knit goods, which is a single-stage system made possible by the introduction of a new peroxide-silicate-caustic formula which accomplishes the causticizing and peroxide bleaching in one operation.

Steam Dyeing. In recent years two new methods have been introduced in continuous dyeing, and they are finding wide acceptance. In one, the pad steam method, the



Shown here is an early type bleach house washer with steam reciprocating drive.

FOR YOUR INFOR M ATION

POLICE PROVE RESLOOM

Officers report no shrinkage

One of the most extensive field tests ever given any textile development now adds further evidence that Monsanto's Resloom effectively reduces and controls the shrinkage of woolen and worsted fabrics, *under practical wearing and washing conditions.*

The test

In this exclusive test approximately 1000 Resloom-treated wool flannel shirts were given 320 members of the Springfield police force. Officers were told to wear them and have them washed without any restrictions on washing methods, save one: Do not boil.

Four months later...

A check showed each shirt had received an average of four washes . . . up to 21 washes in some cases . . . under varied, everyday, practical washing conditions.

None of the shirts shrank out of size.

The shirts received the enthusiastic written approval of the policemen and their wives.

Police Chief Raymond P. Gallagher reported:

"I have yet to hear one word other than praise and commendation. None of the shirts showed enough shrinkage to be noticed, colors remained fast, and the shirts both before and after washing had the *feel of a high grade piece of untreated normal all-wool flannel.*"

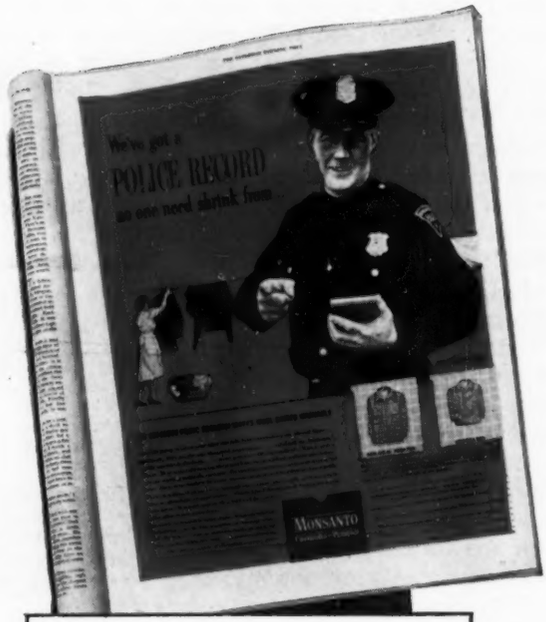
And one year later...

Chief Gallagher again reports:

"I have conducted another survey and find that these shirts are all giving useful service with no officer reporting any unusual shrinkage . . . It would appear that these shirts will still be worn two years hence . . . they are still soft, warm and tough and after considerable washings still indicate a minimum shrinkage.

Prospects for you...

Multiply these 320 Springfield police officers by the hundreds . . . by the thousands . . . and you'll get an idea of the market waiting for washable woolens . . . in sportswear, children's wear, skirtings, blankets, play clothes.



Police Officer Arthur Murphy of Springfield, Massachusetts, announces the results of Resloom tests in this four-color full page advertisement to appear soon in Saturday Evening Post, Fortune, Time, Newsweek and Business Week . . . an example of the extensive promotion which Monsanto gives to stimulate consumer sales of washable woolens.

Only Resloom...

When you select the process to make your woolens washable, remember:

The most and the best of the washable woolen fabrics on the market today are Resloom-treated.

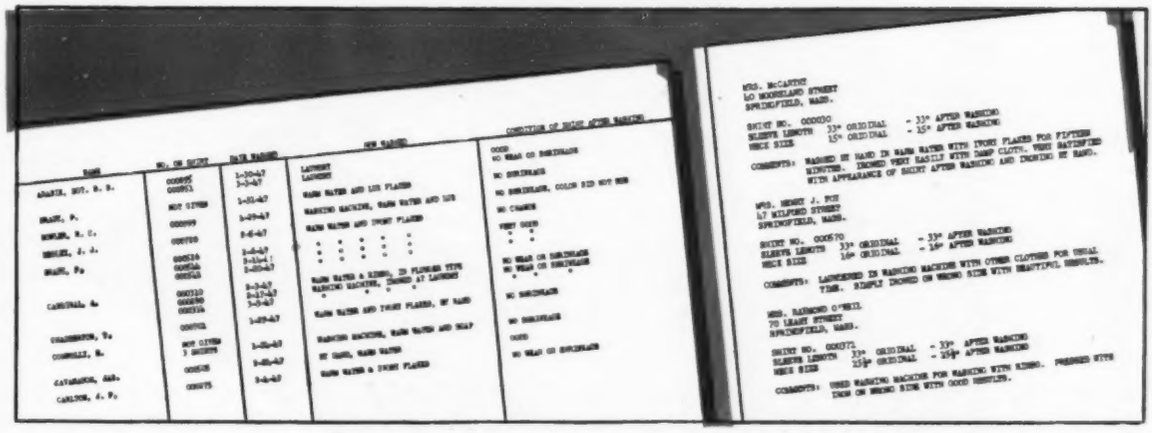
Only Resloom-treated woolens have had this extensive field test, under practical, everyday service and washing conditions, *without a single complaint on shrinkage.*

Only Resloom-treated merchandise has been on sale for more than a year *without a single complaint on shrinkage.*

Monsanto has the technical background, the proved mill and field experience, to get you started on this profitable new market now. Check the coupon at right.

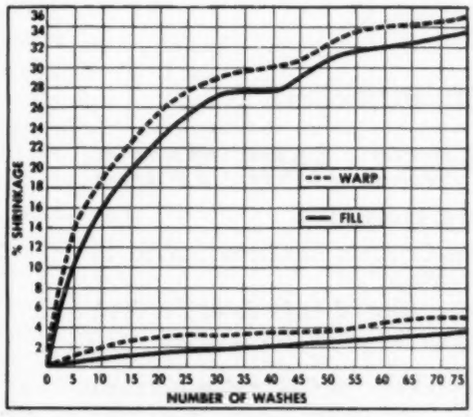
KEEPS WOOL WASHABLE!

Careful records and housewives' comments show RESLOOM'S success in field tests



Careful records were kept of each washing of each shirt . . . and the results were tabulated. At the conclusion of the test, when each shirt had received an average of four washes, housewives reported no noticeable shrinkage. And scientific checking later showed no shrinkage out of size.

Results of the tests . . . as reported in detail by the policemen's wives . . . clearly demonstrate the success of Resloom W in preventing wool shrinkage under all kinds of washing conditions in many different households. Every numbered shirt was reported on for changes in sleeve length and neck size and results were universally good.



Untreated, all-wool 9½ oz. flannel shows up to 34% shrinkage in 75 washes while Resloom-treated flannel shrinks less than 5% in 75 washes . . . far more than the average garment would receive.

Resloom control good for the life of the fabric

Objective laboratory tests are further and conclusive proof that:

RESLOOM EFFECTIVELY REDUCES AND CONTROLS SHRINKAGE OF WOOLENS AND WORSTEDS.

The average consumer woolen . . . such as a sport shirt or blanket . . . gets far less than 75 washes during its normal life. The graph at the left vividly shows that Resloom holds wool shrinkage below 5% even after 75 washes.

The fabric was washed in an automatic washing machine of the type used in commercial laundries. Cycle: two five-minute suds at 100° F with neutral soap on detergent, and four two-minute rinses.

*Reg. U. S. Pat. Off.

MONSANTO
CHEMICALS — PLASTICS

SERVING INDUSTRY...WHICH SERVES MANKIND

Use this coupon for full data

MONSANTO CHEMICAL COMPANY, TEXTILE CHEMICALS DEPT.
Desk No. TIT7, 140 Federal Street, Boston 10, Mass.

Please send me information on:
Resloom W for washable wool

NAME _____ TITLE _____

FIRM _____

ADDRESS _____

CITY _____ STATE _____

A SHORT, SHORT TALE ABOUT "TAILS"

PAT. APPLIED FOR

DESIGNED FOR ONE PURPOSE . . .

TO ELIMINATE UNEVEN PACKAGES AND TAILS

applicable to spinning yarn, also warp spinning

The economy and efficiency of Numo Automatic Spinning Controls has been proved in America's largest textile mills. It offers these major advantages!

- Eliminates the necessity of doffers bearing rail down manually . . . makes doffing easier.
- Eliminates uneven packages from doff to doff.
- Eliminates chokes on spindles.
- Eliminates uneven tails left at butt of bobbins.
- Increases production by saving time at each doff.
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printed part of the cloth is mangled through a solution of caustic soda and hydrosulphite, then entered into a steam box similar to a vat ager where the color is reduced and the fiber dyeing takes place.

In the alternate system, the pigment padded cloth is passed directly into the caustic and hydrosulphite solution at a temperature near the boiling point. As a result, the color is reduced and the cloth is dyed where the color has been placed on the fabric by the padder.

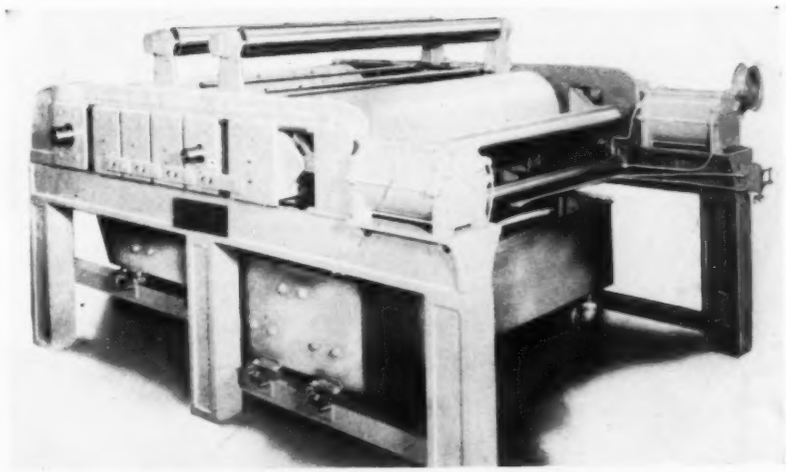
Streamlining and Standardization. Present designing is aimed at making machinery more flexible, more interchangeable, and more basic. For instance, one such machine can be used as an extracting mangle, a caustic impregnator, a universal padder, and a starch mangle. All these diversified applications can be achieved with only variation in the boxes. In addition, with a change in the rolls, the machine becomes a 15-ton rayon calender. Rolls of any reasonable diameter may be used without new parts or major revisions. Attempts at standardization are also incorporated in a new high-speed automatic tenter with speeds in excess of 200 yards per minute.

Such versatility in machinery will naturally lead to mass production of parts which will be reflected in considerable savings to the purchaser and will accelerate deliveries in normal times.

During the last few years a marked improvement in the appearance and design of the new machinery entering the textile fields has been noted. Many of the newer machines have built-in control panels for precision operation and compact overall design.

A Look Into The Future. As the textile dyeing and finishing industry approaches the mid-way mark of the 20th century, and is preparing to enter what might be termed the real post-war era, the period 1950 to 1960, we may expect to find further refinement of processing.

These new refinements will take place as a broader knowledge is obtained through research and practical use and through increasing demand for the new materials that were developed since 1945.



A modern 6-roll horizontal washing machine.

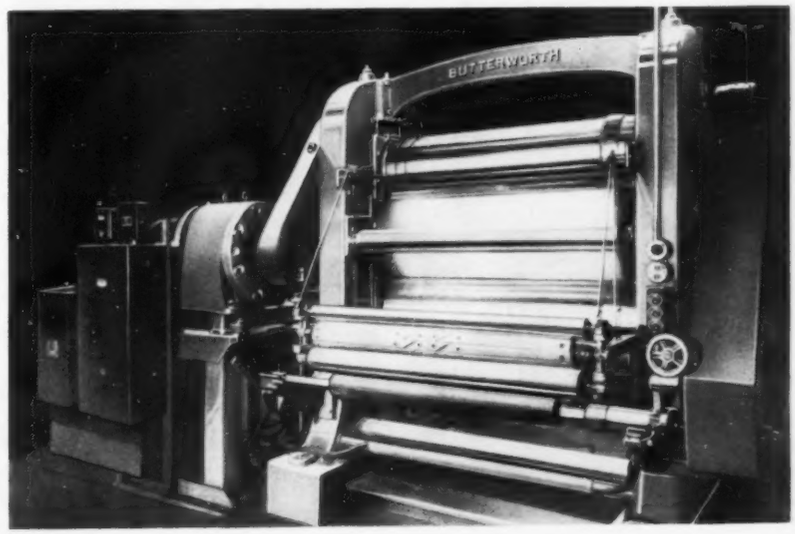
Such improvements will be aided by the trend toward greater simplification of the machinery used in this particular branch of the textile industry and will find wider application as the many advantages of streamlined equipment become apparent to an ever increasing number of users.

Further improvements are also anticipated in the application of electrical equipment for range drives in which several machines are operated in unison, and in the refinements of tension controls, so important a factor in the handling of textiles.

Though it is generally believed that we are now approaching the practical maximum of operating speeds in many processes, it is anticipated that many slower operations will be speeded as progress in power transmission is made possible by precisions of speed control hitherto unknown.

Many new developments and changes in finishing and dyeing will come from the chemist and colorist. This in turn has convinced us that the designing of machinery for new processes and new applications will require greater cooperative endeavors and a complete understanding between the chemist and the engineer.

Illustrative of the improvement in appearance and design of present day machinery is this 80-ton, 3-roll hydraulic calender.



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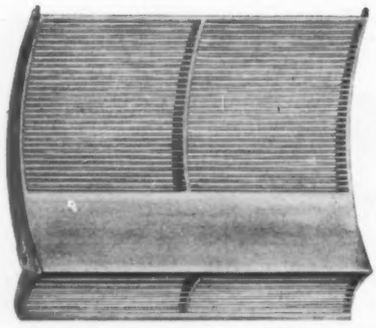

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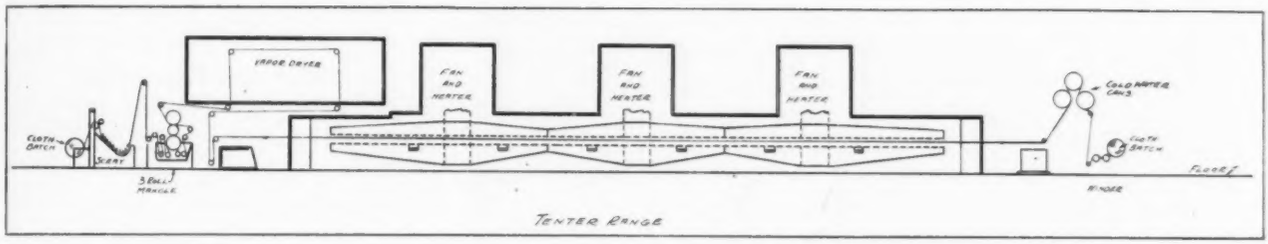


Progress in finishing is exemplified by development of the Everglaze* process. Typical range is shown.

50 Years of Development of

Fabric Finishing Materials

By ARTHUR E. HIRST
Standard Chemical Products, Inc.

The momentum of improvement in finished goods has been great during recent years. This article reviews some of the developments.

BEFORE the era covering the existence of TEXTILE INDUSTRIES magazine, that is until fifty years ago, there were gradual improvements in dyeing and finishing textiles, but the application of chemical principles and research was not given the attention the industry deserved, so that progress was slow and perhaps not considered of great importance. However, during the last five decades the general public has become increasingly style conscious and has learned to be demanding from the standpoint of quality—more insistent on a greater return for their dollar.

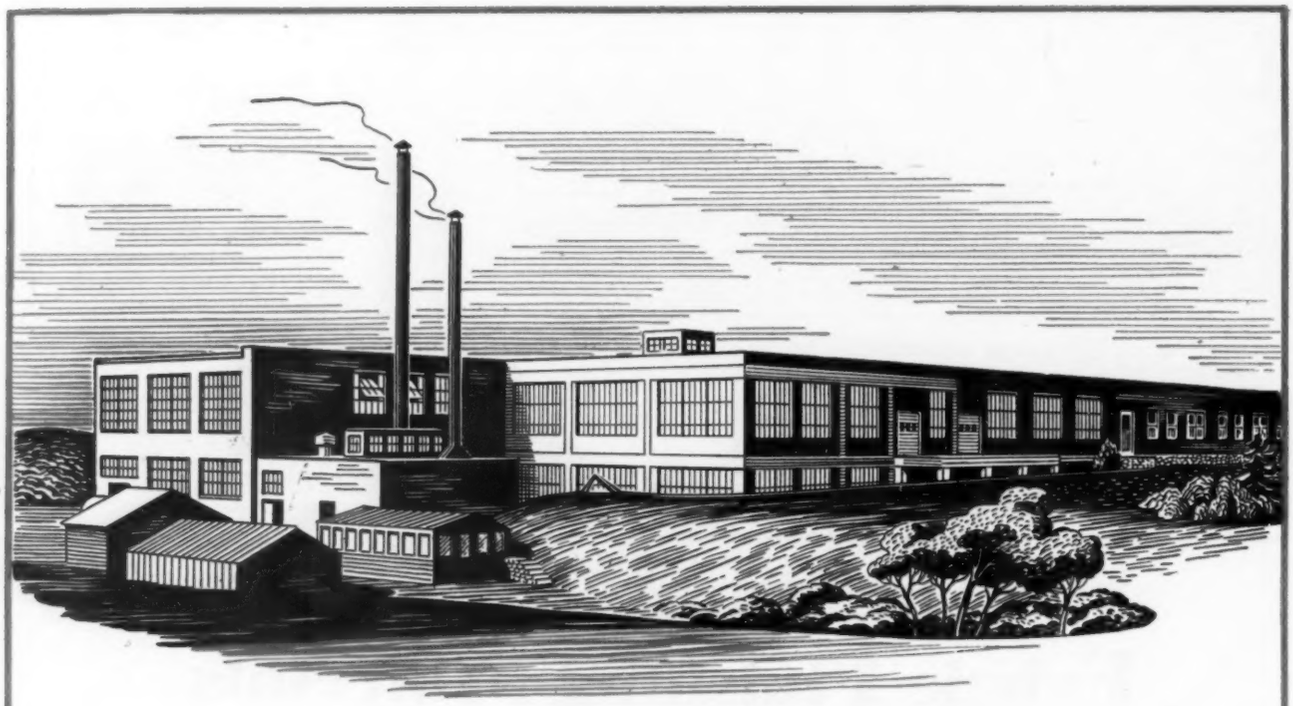
The momentum of improvement in finished goods has been particularly great during very recent years, so much so that space available here permits a consideration of only some of the most important developments in dyes, dyeing, printing, and other phases of finishing. It is to be kept in mind therefore that the following story does not by any means include all important developments over the fifty years just passed; it is in reality very sketchy.

*A trademark signifying fabric finished and tested according to processes and standards controlled and prescribed by Joseph Bancroft & Sons Co.

Boiling-Off and Bleaching. However good the dyestuff or finishing process may be, the final result is definitely influenced by the condition of the goods as they reach the dyehouse or finishing rooms. We may therefore consider first, progress in quality and economy in the bleach house.

The methods of bleaching cotton goods were virtually unchanged to any considerable degree for many years, and in most finishing plants essentially similar processes are used. Jig scouring was prevalent and still is, for boiling-off heavy goods, as is the case with kier boiling. While the kier under proper control does an excellent job, it involves an inherently slow procedure, and the equipment occupies a great deal of space. During the boil it is not practical to see how the process is proceeding, and there is always some danger of the formation of oxy-cellulose.

After the kier boil it was customary to bleach the cloth to a good white by the use of chemic —hypochlorite of calcium or sodium, which process, unless properly controlled, had a tendency to result in tendering. Later years brought about the use of hydrogen peroxide after the kier boil, to do the actual bleaching, and this process has been increasingly popular.



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The perfecting of this process very recently resulted in the development of a continuous boil-off and bleach which gives excellent results for plain white or dyed shades, together with greatly increased production and easier control. The processing may be carried out either in the rope or open form. A very brief description follows.

Continuous Bleach. A pretreatment consists of washing in warm water in a slack washer or saturating in a padder with acid, then rinsing. Saturation with alkali follows, then steaming in a J-box for an hour somewhat above boiling temperature. Bleaching is then accomplished in similar apparatus by heating with peroxide and alkali in a J-box.

The foregoing described process is the greatest advance in bleaching in many years, the production efficiency being such that two and one-half hours running does the same work as twenty hours in the older standardized bleachery.

Synthetics. Viscose, acetate, and other synthetics are comparatively new in the family of fibers, and the changes in methods of boiling-off consist mainly in modernizing of equipment. The old "stick" boil-off was used for many years, but production per machine was slow and required constant attention by the operatives. Now there are various types of continuous boil-off machines which give, for instance, comparative freedom from break marks in crepes and thorough removal of dirt and size.

Temperature control for acetates, selection of the newer types of detergents, knowledge of methods of partial saponification of acetates or prevention of undesired saponification—all are comparatively recent developments required by mass production of synthetic textiles.

Detergents. While the subject of detergents might be considered to be in the province of more strictly chemical advances, such products have such an important bearing on the absorbency and cleaning of textiles that we may well discuss them.

"While the kier under proper control does an excellent job, it involves an inherently slow procedure, and the equipment occupies a great deal of space."

Although soaps were used in antiquity, it has been during the years of advancing knowledge of organic chemistry that notable improvements have been made in the detergent field. In the field of soaps few new fats have been introduced, but a tremendous amount of research has been done on synthetic detergents and is still being carried on.

In the past the more popular synthetic detergents were sulphonates or sulphuric esters, as opposed to more recent developments containing no sulphur, such as ethers of polyhydric alcohols. Other recent developments are amino or quarternary ammonium salts.

One of the serious defects of the simpler detergents such as soaps is their precipitation with metallic salts, such as lime and magnesia in hard water. Most of the better modern washing agents do not form insoluble salts with these elements and so do not present the difficulty of stains and scum.

Kier boiling assistants and scouring compounds have increased in complexity with the incorporation of solvents and more efficient wetting agents, so that greater absorbency and freedom from foreign matters in the goods are brought about, in many cases with saving in time and risk of spoilage.

Here in particular we find that better knowledge of organic chemistry and cooperation between the textile industry and chemical manufacturers pay gratifying dividends.

Dyes and Dyeing. The advances in dyes and dyeing methods and quality have spread over many years, as described in the voluminous literature on the subject. From vegetable and mineral dyes the art progressed into the production of shades with colors derived from coal tar, the earliest being direct and basic classes.

Research, with the goal of better fastness qualities, required the best type of organic chemical talent and resulted in the modern dyestuffs such as vats, naphthols, and modern pigments. The attainment of this goal has enormously improved the quality of fabrics made from all types of fibers.

Taking vat dyes as a type of those meeting present day consumer demands, we see a quick transition from shades of poor or moderate fastness given by basic and direct dyestuffs, to those meeting all reasonable demands. Knowledge of the intricate chemical constitution of vat dyes gave the general procedure necessary to bring about combination of dye and fiber, but in the early days of this era considerable difficulty was

experienced in producing level and uniform shades.

From application of the reduced color in the jig, with subsequent oxidation, through the pigment pad and continuous methods, very recent developments in plain shade dyeing via the pad-steam and Williams machines came into being, bringing about greater hourly production and more uniform shades.

"Ice" Colors. Though the "ice" colors—insoluble dyestuffs formed through chemical reaction on the goods—were known many years ago, as typified by paranitraniline red, it was not until the early years of the twentieth century that great improvements were made in this type of dye. These were so-called naphthol colors, the shades produced by combining a chemical applied to the goods with one or another of a family of complex developers. Such shades are noted for brightness, but not all are of first grade fastness.

Soluble Vats. Then as a direct result of the vat colors came the Indigosol or soluble vat type which permitted greater production and uniformity, especially in the lighter shades. At about the same time new printing colors were devised, derivatives of the modern naphthol colors, first named Rapidogens. These dyestuffs in many cases made it feasible to eliminate preparing of the goods with the naphthol to produce a good variety of bright shades.

In the development of the acetate type of rayon it was found necessary to solve the problem of producing new dyes which would color the fiber and possess adequate fastness. This was done by some modifications in selecting direct colors.

Pigments. Another modern development used in dyeing to some extent but more in printing, is the application of pigments to cloth by binding with suitable resins.

Not only have the vat dyes brought about a vast improvement in dyed and printed fabrics, but in the immediate past some of the inherent difficulties of producing uniform plain shades at high speeds have been largely overcome by the invention of new machines. We refer to the DuPont pad-steam process and the Williams units.

In the first named process the color is padded on in pigment form, dried, reduced in another padding machine, steamed in an air-free chamber, then reoxidized, all in range.

The use of the Williams units is an outgrowth of the well known continuous dyeing of vat colors and eliminates some of its drawbacks. The Williams units replace the large booster boxes and permit greater economies through the use of smaller volumes of liquor. The cloth is padded through a vat color dispersion, dried or not as conditions require, and passed through one or more Williams units where reduction and dyeing take place. The units are comparatively small, and due to the restricted area of travel, pressure and rapid circulation are brought about.

Printing. The printing machine is fundamentally the same now as it was decades ago, and improvements during the past fifty years result largely in greater production and economies. During the last few years the installation of machines running at 300 yards per minute and over has increased, necessitating refinement in many parts.

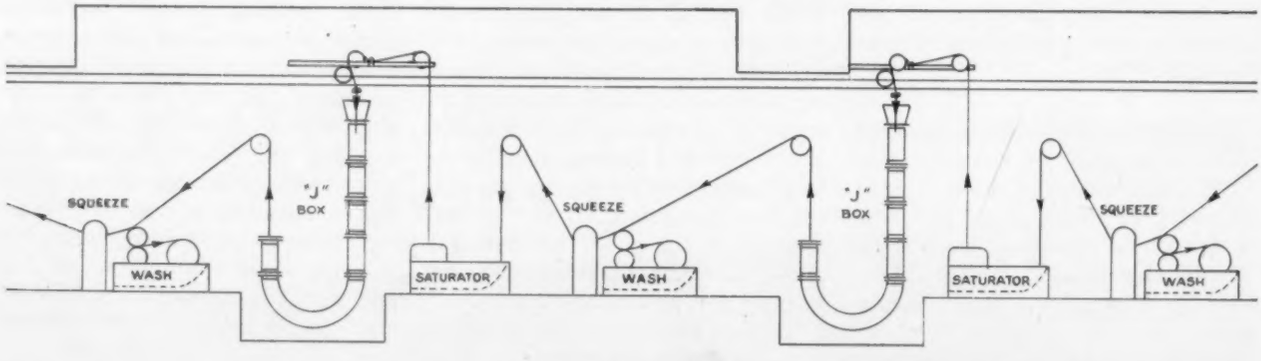
In some plants, blanket washers have been installed in range with the printing machine, largely eliminating back greys. Special arrangements of cloth feeding devices to a limited extent permit running two patterns simultaneously on the same machine, one pattern on the front and the other on the back. For sheer fabrics such as marquisettes it is also common practice in some plants to run one piece of the bleached goods superimposed on another.

Printing thickners of olden times are still largely used, for instance, starches, dextrines, and natural gums, because they work well and apply to most of the modern colors.

The important process of engraving the printing rollers is still carried out as was done many years ago, although photographic engraving is now used to some extent for special fine patterns. A new method of photographing patterns directly onto sensitized cloth is being experimented with but is still definitely in its infancy.

Refinishing. The greatest diversification of improvements in the treatment of textiles probably comes in the many phases of the final finishing operations. During

The development of continuous boil-off and bleaching is the greatest advance in bleaching in many years. The production efficiency is such that 2½ hours running does the same work as 20 hours in the older standardized bleachery.



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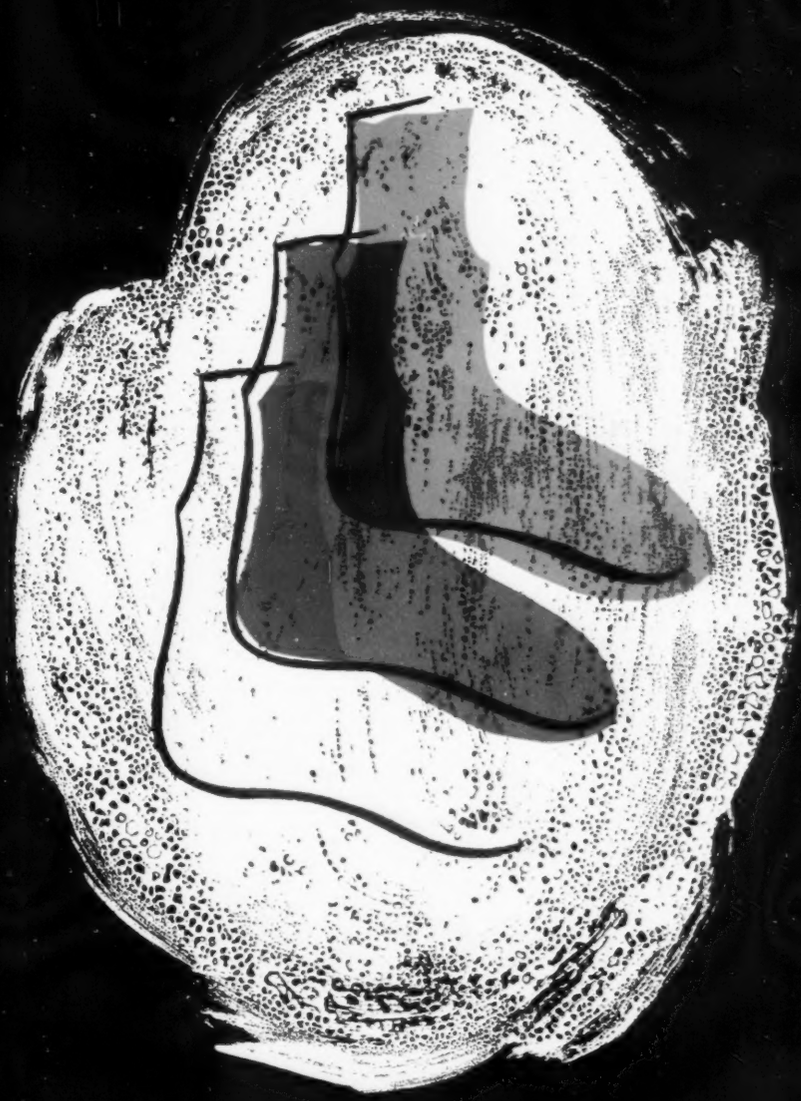

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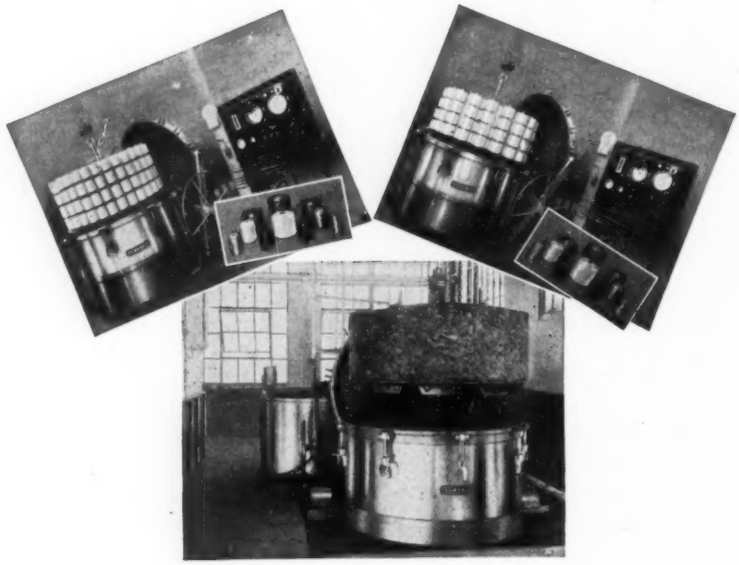

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recent years innumerable changes, chemical and mechanical, have resulted in enormous improvements from the consumer's standpoint, more attractive hand of fabric, greater durability, permanent finishes, shrinkproof garments, and many other helps. A very few will be touched on here, and most of the processing details will be left to the reader to find in articles devoted to the methods individually. Many developments not treated here need not be considered of minor importance, and many are closely interrelated.

Compressive Shrinking. Until the 1920's, shrinking of cotton fabrics during laundering was regarded as an evil which must be tolerated, and it was customary for the consumer to purchase garments somewhat larger than constituted a good fit in order to allow for the expected shrinkage. At about that time S. L. Cluett of Cluett, Peabody & Company, Inc., worked out a process of "Compressive Shrinking," the well known process now known universally under the trade mark "Sanforized."

He soon designed a machine which accomplishes the result continuously, mechanically relaxing the yarns in piece goods so that after washing, the residual shrinkage does not exceed one per cent in warp and filling.

The process and trade mark are now known and used all over the world, so that it is possible to obtain any type of cotton garment and other merchandise which does not possess the defect of excessive shrinking and which is improved in finish and appearance. Over two billion yards of goods are now finished by this process annually.

Permanent Finishes. For many years "chintz," cotton fabrics bearing a high luster on one side, were known, and such goods were popular, particularly for draperies. Common to all such goods in the early years was the defect of impermanence of luster; that is, as soon as they were subjected to even moderate washing or wiping, the glaze disappeared. Through the research efforts of Joseph Bancroft & Sons Co., a great advance was made in the development of a permanent glaze—one which will withstand repeated laundering or dry cleaning and which imparts an attractive hand. Shrinkage is reduced to less than two per cent.

Briefly, the process consists of simultaneously glazing or calendering, and polymerizing a thermosetting resin of the ureau formaldehyde or melamine formaldehyde types applied to the dyed or printed, washed, and sized goods. The resin is padded on, dried, and the goods friction calendered, then washed and softened chemically or by running on a plain calender.

Early finishes on goods such as rayon or acetate dress goods were deficient in permanence to the extent that moderate washing left the garment flabby and lifeless, since the finishing chemicals were easily soluble or emulsifiable in water. In recent years great advances have been shown in the production of finishes resistent to many launderings and dry cleanings.

In most cases the materials used are resins of a number of kinds typified by methyl methacrylate, urea-formaldehyde, and melamine-formaldehyde. These are applied as mixtures of the constituents, e.g., ureau and formaldehyde, together with necessary chemicals to bring about polymerization. Originally the finishing plants were obliged to use the raw materials, but now they may purchase products which need only be baked and washed to produce the desired results. The resulting finish having penetrated into the fibers and made insoluble therein, the threads are anchored in place, and so the cloth becomes shrinkproof to a high degree.

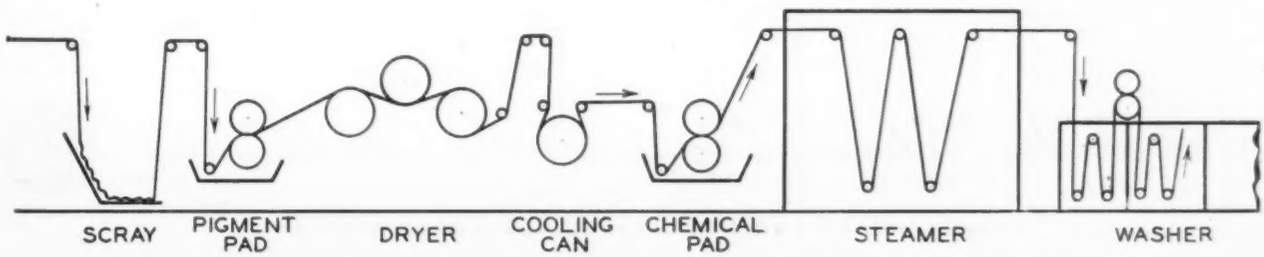
Crease Resistant Finishes. The first and one of the most important applications of resins to cotton and rayon fabrics was the Tootal, Broadhurst, and Lee process of making such fabrics crease-resistant through the formation of synthetic condensation products in the form of resins (urea-formaldehyde and phenol-formaldehyde) by baking.

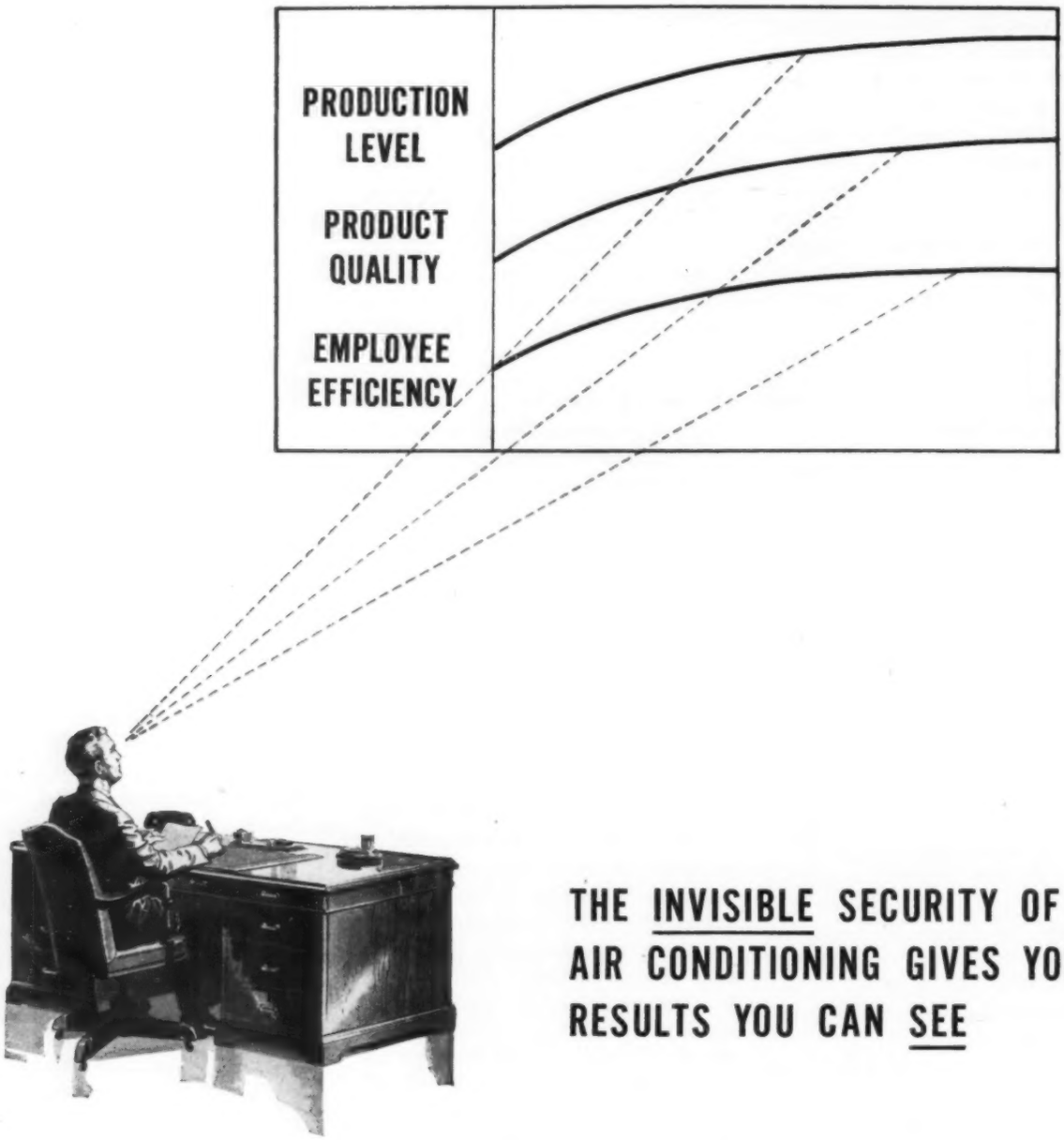
The urea-formaldehyde resins were found to be the most satisfactory from the standpoint of lack of undesirable color. Little interference with the natural properties of the fiber was encountered, and spun rayons could be made to imitate woolens. Strength, elasticity, and resistance to wear were increased.

Attempts have been and still are being made to perfect the use of water-soluble types of resins for this purpose. The dimethyl urea and melamine types are a step in the right direction, the latter particularly being suitable to enhance the resistance of woolens to washing and shrinking.

Finishes with Cellulose Derivatives. Less popular than resins but still important, are certain cellu-

Some of the inherent difficulties of producing uniform plain shades at high speeds have been largely overcome by the development of the pad-steam process. A typical pad-steam dyeing range is shown here.





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HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

lose derivatives, particularly for netting material. In general use they are of two types, differing chemically but both soluble in caustic soda. The type known as Ceglin is a hydroxy ethyl ether of cellulose, and the other is purified cellulose dissolved in caustic soda and sodium zincate, called Celfon and also Kopan.

Application is carried out by padding the goods through the solution containing pigment and fungicide, running into a scray or batching on rolls, then coagulating in sulphuric acid. Rinsing and neutralizing completes the operation.

Shrinkage Control of Wool. While experimental work on this subject has been carried on for years, it is only within the last ten or twenty years that active development has gone on. A number of widely divergent methods have met with more or less success, but here we will consider only two, the melamine resin and Protonize processes.

The most satisfactory product in the class of resins for shrinkage control of wool is a methylated methylol melamine, which can be applied to raw stock, skeins, piece goods, and other forms. Ten per cent of resin on the weight of the cloth, when piece goods are in question, is used to obtain maximum shrinkage control. Various types of hand are possible.

In practice the goods are padded on a mangle with the resin solution and run directly onto a pin tenter dryer. Hand and porosity are not adversely affected as is the case with some strictly chemical treatments, and for most fabrics resiliency and wearing characteristics are unaffected, as is tensile strength. Abrasion resistance is usually increased.

A shrink-proofing process recently devised by Alrose Chemical Company of Cranston, R. I., is called Protonizing, and is applied to wool top, yarns, piece goods, hosiery, etc. It consists essentially of treating wool with a chlorine compound by either of two methods, the acid process and the alkaline process, the first producing a very white fiber without further bleaching, and the second giving a very soft hand with excellent strength, abrasion resistance, and level dyeing properties.

The process in general consists in chlorination by the use of sodium hypochlorite and sodium sulphamate, sodium chlor-sulphamates being formed. Antichlor treatment is applied, and the goods are ready for finishing.

Cationic and Anionic Softeners. Ever since the finishing of fabrics has been practiced, softeners of various types have been used, for many years of the simpler types such as soaps, oils, etc., but they were all deficient in durability, washing out readily and leaving the goods harsh and stiff. Until the first World War progress in this field was comparatively slow and did not keep pace with that of other materials used in beautifying cloth. In the early 1920's greater scientific effort began to be applied. Sulphonated oils and tallow were successful in improving the hand of cotton and rayon fabrics but were transient in their effect.

More permanent softening agents came to light in the development of cationic complexes. In the middle 1930's it was discovered that the quarternary ammonium derivatives of various cationic active compounds were fairly permanent softening agents. They contain a cation in the long hydrocarbon chain, hence the term "cationic softener" and their affinity for the anion of cellulose. They are more stable in acid than in alkaline solutions and resist precipitation by salts.

As opposed to the cationic products, the anionic softening agents have long been known, soap being one of the longest known examples. Others are sulphonated oils and stearic acid softeners, and are not at all permanent.

Water Repellent Finishes. For years fabrics of many types have been treated in various ways to resist penetration of rain and snow. Coating with rubber and similar materials are of course well known and need not be considered here.

The simpler processes as carried out in the usual finishing plants remained static for years, with little improvement in permanence. For such goods as raincoatings, long before the first World War it was the practice to impregnate cotton goods with acetate of alumina solution, dry, then pass through an emulsion of a soap such as sodium-ammonium stearate. Thus a metallic soap was formed throughout the fibers and in the interstices of the cloth, forming a film which shed water under normal rain conditions.

Millions of yards were used in the war for army raincoats, tents, etc. The water repellent finish was fairly satisfactory except for instance where a heavy rainstorm was encountered. Moreover, a few washings emulsified the repellent, and dry cleaning of a garment easily removed it.

Some improvement was made by development of one-bath water repellents composed of wax emulsion —usually paraffin wax—containing aluminum salts. With these it is necessary simply to pad the goods through a diluted emulsion and dry. The repellency is quite satisfactory and in many cases su-

In Retrospect

(Textile Industries, July '07)

If feasible, every manager of a cotton mill should possess a microscope, and know how to handle it. The microscope is useful not only in determining the spinning qualities of the fiber, but also the defects arising from its imperfections in the woven or finished goods.

A photographic camera would also be of great assistance to the mill manager in obtaining photo-micrographs of fibers of any particular lot or mixture.

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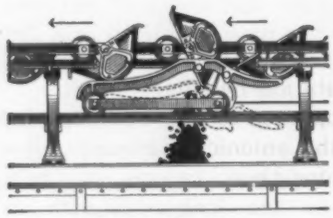
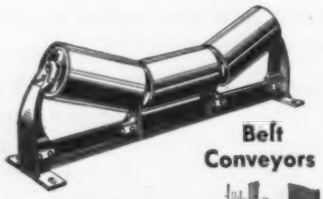
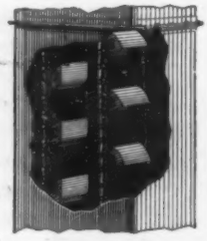
Meets Every Need of Industry in Handling Coal and Ashes



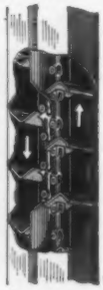
Bucket Carriers



Belt Conveyors



Bucket Elevators

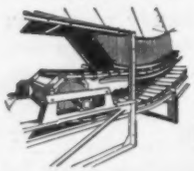


Bulk-Flo

Screw Conveyor

Skip Hoist

Coal Crusher



Feeders

Car Dumper

Weigh Larry

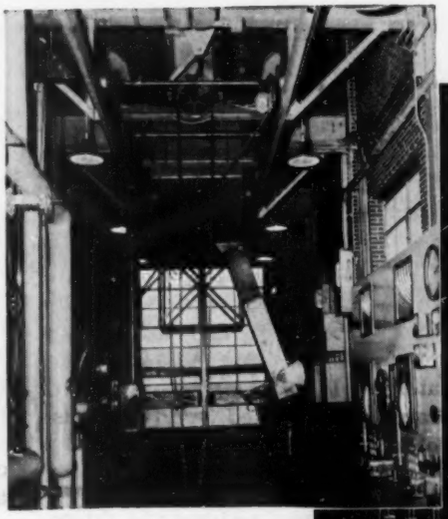


Photo at left shows interior of boiler room with weigh larry in foreground, at Riegel Textile Company.

LINK-BELT Coal Handling System *provides flexibility at Riegel*

In the boiler plant phase of the continuous modernization of Riegel Textile Company, Trion, Ga., flexibility was a major consideration. To circumvent fuel emergencies, the two steam generators were planned to switchover from one fuel to another.

Flexibility and efficiency in coal handling are provided by an integrated system of Link-Belt standardized units. The sketch above shows the components. Coal is received through grating to track hopper. An apron feeder serves the pulverizer. Crushed coal is taken by bucket elevator to top of bunkers where it is distributed by screw conveyor. Duplex discharge gates permit self-propelled weigh larry to distribute to coal receiving chutes.

We will be glad to give you further details of this and other cost cutting installations. Get in touch with our nearest office.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.

11,181

LINK-BELT — THE SYMBOL OF QUALITY — LINK-BELT — **BELT**

COAL AND ASHES HANDLING EQUIPMENT

perior to the older two-bath method.

Within the last ten years a great advance has been made in the attainment of a long sought goal—a permanent repellent which will withstand washing and dry cleaning with comparatively little decrease in efficiency. This is called Zelan and is manufactured by E. I. DuPont de Nemours & Co. It is of the nature of a complex organic pyridine derivative and is applied from water solution, dried, and heated at an elevated temperature, giving a soft, attractive hand.

Where transparency is not objectionable or is an added attraction, such merchandise as raincoatings and shower curtains are frequently coated with various types of the new resins.

Mildewproofing. It is only in recent years that the study of the mildewproofing of wool and cotton fabrics has received intensive scientific study, much of it having been encouraged by wartime necessities, especially in the tropics. Chemical compounds of many types have been studied and some adopted commercially, the choice being largely determined by the ultimate use of the goods. A few materials used with more or less success are as follows:

(a) Alkylated dimethyl benzyl ammonium phosphate, alone and combined with methyl acrylate resin.
(b) Pentachlorodioxytriphenylmethane sulphonic acid, commercially satisfactory for wool.
(c) Salicylanilide, followed by treatment with methyacrylate resin or wax-aluminum acetate emulsion; satisfactory if the treated goods are not steam sterilized.
(d) Salicylanilide emulsion with wax and aluminum acetate.
(e) Various phenolic compounds. These impart irritating odors to the fabric.
(f) Various metallic naphthenates and copper propionyl acetonate, most of which impart color to the fabric.
(g) Cadmium chloride followed by borax.

Since each of the products used has some drawback such as toxicity or impermanence, intensive study is still being carried on.

Mothproofing. The early methods of mothproofing are well known, as applied to garments stored for the summer months—the use of naphthalene balls, cedar oil, and chips and such "old fashion" preventives, but considerable advance has taken place in recent years. Foremost among the newer chemicals is what may be considered a colorless acid dye—pentachlor-dioxy-triphenylmethane sulphonic acid. This has good fastness to washing, light, and dry cleaning. It should be noted that fastness to light is important in such compounds.

Whatever the type of proofing against moths, carpet beetles, etc., one must consider the deleterious effects of friction, moisture, and washing. This is applicable to such compounds as silicofluorides. The study of this subject being of comparatively recent origin, progress is not particularly impresive, but the future promises much more rapid advance than the past.

Flameproofing. Back as far as 1638 the idea of flameproofing textiles was discussed, but there was little activity until fairly recent years when municipalities and states began to demand action to prevent repetition of many serious accidents from flash fires. For over a hundred years such chemicals as ammonium sulphate, ammonium chloride, and borax were recognized as flame retardants, but not as wholly satisfactory.

In 1935 sodium tungstate with ammonium phosphate was used. Then gradually research into the subject brought to light other products such as compounds of tin and the following, which may be considered new:

(1) Diammonium phosphate. This is soluble, hence not permanent.
(2) Diammonium ethyl phosphate; soluble, but giving a better hand than (1).
(3) Boric acid with sodium borate. This mixture is soluble and does not prevent afterglow, an important requirement of flame retardants.
(4) Chlorinated paraffin and antimony oxide; insoluble but difficult to apply. It has excellent flameproofing and waterproofing properties and is fairly effective against afterglow.
(5) Resin impregnation. These products are new for the purpose, and, being permanent, are fairly satisfactory.
(6) Ammonium Sulfamate. This is a very recent development and gives quite satisfactory results, though not permanent, and by itself it does not prevent afterglow. It has a tendency to weaken treated rayon fibers. E. I. duPont de Nemours & Co., developers of this compound, has produced a more satisfactory retardant which is a mixture of the sulfamate and modifying agents to prevent afterglow, minimize fiber strength losses, and permit better penetration.

It will be seen that flameproofing processes and materials thus far developed leave much to be desired in permanence.

In Retrospect

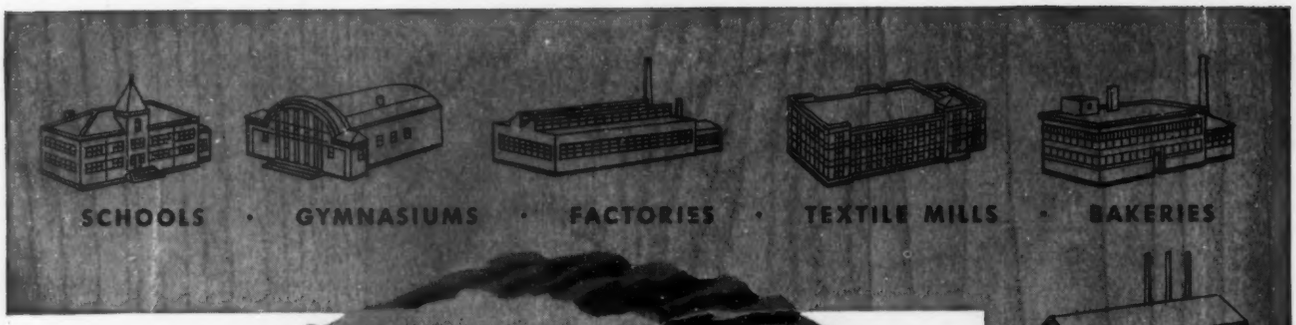
(Textile Industries, March '04)

All payments for advertising and subscriptions thereto must be made direct to the home office in Atlanta. Agents are not allowed to make collections under any circumstances.

In Retrospect

(Textile Industries, January '11)

We are promised that, within the next four years, the dream of the centuries shall be accomplished and ships shall pass from the Atlantic to the Pacific by a canal through the Isthmus of Panama.



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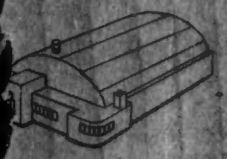
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BALL ROOMS

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Our 51st year finds Northern Hard Maple Flooring becoming more and more available after several years of short supply.

During the past half century, association mills have produced more than four billion feet of this fine flooring. Many floors of tough-fibred, tight-grained Northern Hard Maple, laid thirty to fifty years ago, are still giving satisfactory service.

Millions of feet of Northern Hard Maple have been laid in textile mill floors and other industrial floor spaces subjected to heavy usage. Designers of textile buildings know that mill floors can become a serious problem if a sound heavy duty finish floor is not specified. They know Northern Hard Maple Flooring can take punishment and stand up under constant wear. That's why they have specified MFMA Northern Hard Maple over a long period of years.

And, maintenance engineers know that Northern Hard Maple's resistance to wear means low upkeep cost. Traffic moves easily, safely, over its smooth, non-slippery surface. It resists spots and stains—can be thoroughly cleaned by brushing when properly finished.

The employees too, know that Northern Hard Maple Flooring is comfortable under foot. So warm, dry, really resilient, it prevents loss of body warmth through conduction, protects workers' energy every minute. And, bright, clear Hard Maple floors reflect light, improve illumination.

Consult our Research Department when you have floor construction and finish problems. See Sweet's, Section 13 f/5 for technical data.

MAPLE FLOORING MANUFACTURERS ASSOCIATION
Room 393 - 46 Washington Boulevard
Oshkosh, Wisconsin

MFMA SINCE 1897

FLOOR WITH NORTHERN HARD MAPLE
BEECH AND BIRCH

Cotton Type Machinery

The editors express appreciation to Whitin Machine Works for supplying much of the information appearing in this article.

Spectacular developments overnight? No. But by comparing the beginning and end of the 50-year span, progress shows true value.

IN REVIEWING a half century of progress in textile machinery development, the absence of spectacular or revolutionary designs or processes is, in general, the reason why one may ask, "Why doesn't someone invent a machine to increase profits in the industry?"

By comparing the beginning and end of a fifty year span the saga of progress will show its true evaluation.

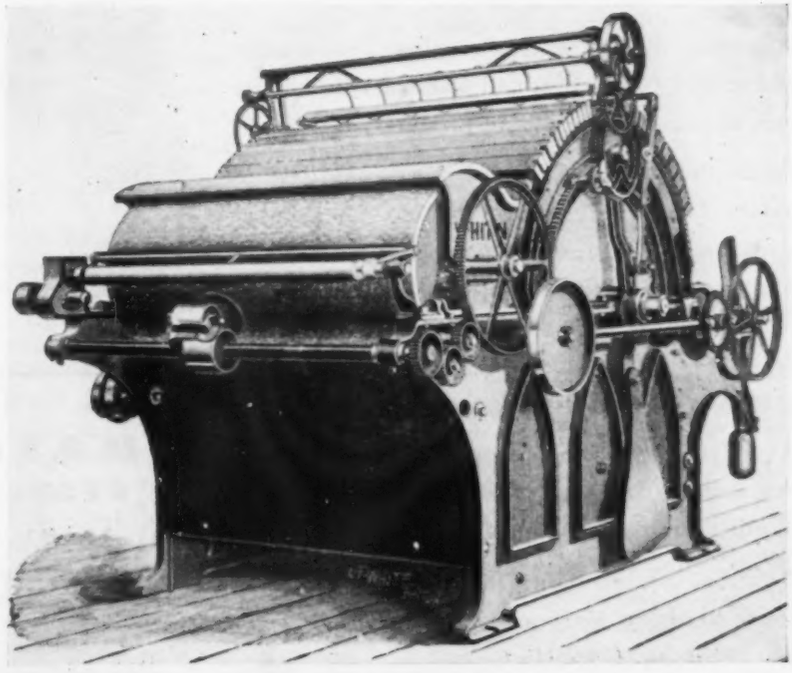
The story of the intervening years is made up of many ingredients—constant research, machine refinements, progressive developments, perfection of previous ideas in design and processes, and more efficient application of components. These factors all contribute to increased production, better quality goods, and manufacture of new fibers and fabrics.

Here and there, specific examples may be quoted to indicate an outstanding machine improvement or method change whose adoption by the trade has marked an era in progress. The high ratio between major and constant minor improvements is often submerged in that hardy perennial—factions who make recurring demands for radical changes in methods long established by many years of experience in basic fundamentals.

Equipment in 1898 Mills. The year 1898 found cotton mills without opening and cleaning machinery more elaborate than the bale breaker and perhaps a cleaning trunk through which the stock was exhausted into bins from which it was fed by hand to the pickers. The picking machinery itself consisted of three processes; breaker, intermediate, and finisher.

The stationary top flat card was still in use in some mills, but was being rapidly superseded by the revolving top flat card as we know it today. Many mills were still using railway heads and lap winders. Three or four roving

The stationary top flat card was still in use in some mills in 1898 but was being rapidly superseded by the revolving top flat type.



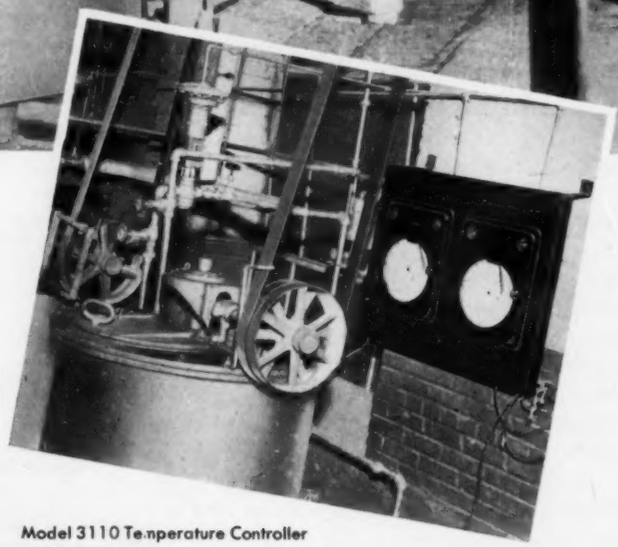
Masoneilan Temperature and Pressure Controllers and Control Valves in the Pell City plant

Avondale Mills uses Masoneilan Temperature and Pressure Controllers and Control Valves in its plants to assure uniformity of product.

In the Pell City mill, Time Cycle Cooking Temperature Controllers control ¾" No. 38 Control Valves. Steam pressure is 90 PSI. The operation is as follows—cooking schedule 70° to 180° in 20 minutes. Hold at 180° 10 minutes. 180° to 210° in 10 minutes. Hold at 210° for 20 minutes. Drop off and hold at 180° until size is used up.

Avondale Mills also uses other Masoneilan equipment such as pressure regulators, Exact-A-Load, and other control equipment.

You too, can maintain product quality and uniformity by using Masoneilan equipment in your mills. Write for information.



Model 3110 Temperature Controller installation in the Alexander City plant.

MASONEILAN

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processes were commonly used for medium and finer counts, and at least two and in many cases three drawing processes.

Spinning frames were 2½", 2⅝" or 2¾" gauge, with band driven spindles, small diameter rings, and short traverses from five to six inches, and were operated with short drafts of 8 to 10. Frames were usually short, many having as few as 208 spindles, although the standard frame in 1900 had 240 spindles.

Spindle speeds were from 7000 to 8900 revolutions. Spinners operated from five to seven sides each, commonly doing their own creeling and doffing. On fine, soft twist yarns, mules were used for spinning. Spoolers of short length, of 4½" or 4¾" gauge with traverses of 5" or 6" processed the yarn for warping.

Perhaps the most notable advance in textile machinery in 1900 was the introduction of box head spinning and twisters.

These spinning frames were installed in a New England mill in 1879.

Developments Through the Years. In the year 1907, tape drive was first applied to ring twisters. In 1909 the first large installation of semi-large package ring spinning frames was made. The period between 1908 and 1918 saw the beginning of demands for tire fabrics which was largely responsible for the adoption of wider gauges and larger packages, especially for twisters.

In 1910 the deep vertical ring for heavy twisters came into use, and in the year following tape driven spindles were applied on spinning frames. The ball bearing spindle came into use on heavy twisters in 1913.

In the year 1916 there was a noticeable demand for large package tire cord twisters and for large package "long length" thread twisters.

Efficiency Systems. Up to that time there had been no general tendency on the part of cotton mill operators to extend the work load of operatives, and no so-called efficiency systems had been brought forward. One of the early scientific arrangements of help was put into effect in a northern mill shortly after 1921, as a result of studies made by the mill during a time when the mill was closed by a strike of the operatives. When the mill was again started, it was on the basis of measured jobs.

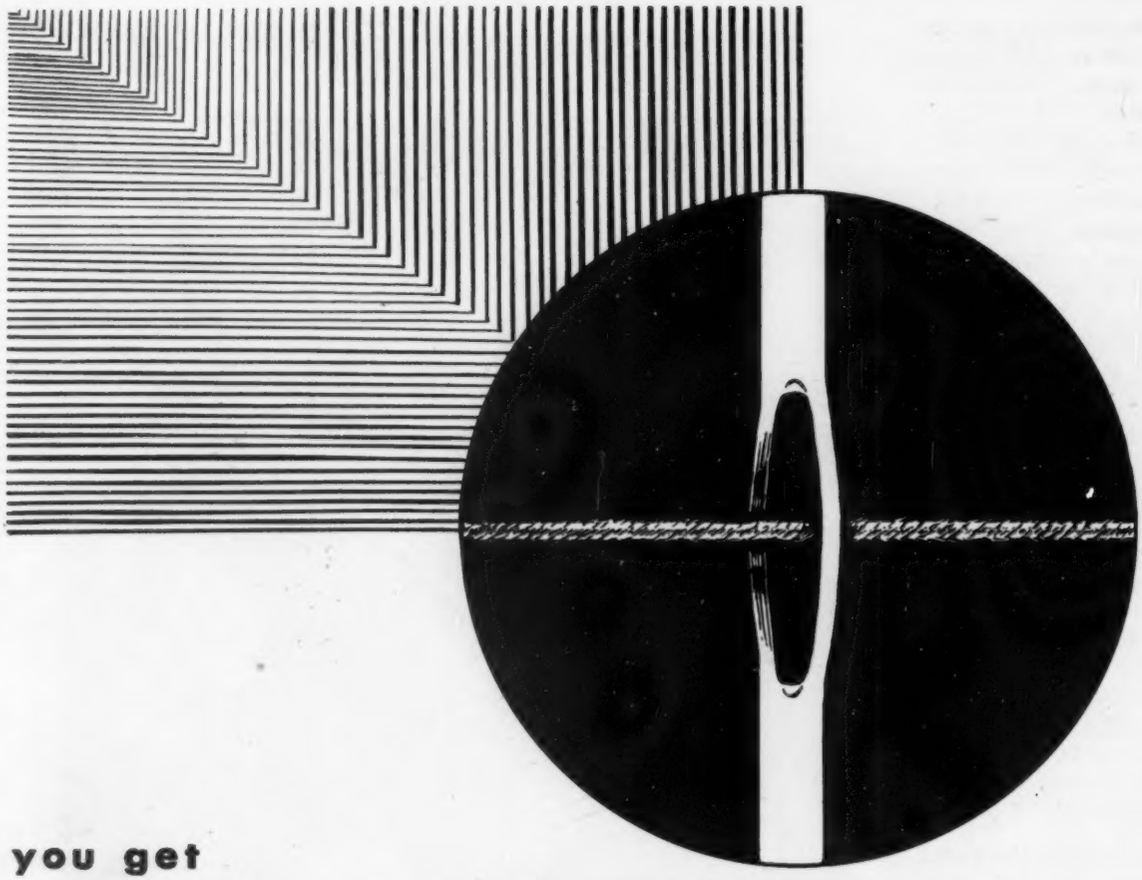
At about this time several systems were advanced with the objective of measuring more accurately the ability of cotton mill operatives to handle their work in the various departments. Among these were systems developed by Barnes Textile Associates and Textile Development Company. The Bedaux system, which is an incentive system, also contributed.

Long Draft. High speed spooling and warping brought about definite advances in design. Long draft spinning, introduced shortly after 1920 into this country, was adopted at a moderate rate of speed for the ensuing five or six years, but between the years 1929 and 1947 it made tremendous strides. It is estimated that not less than fourteen million spinning spindles have now been equipped with one or the other of the leading systems.

An adaptation of the drafting system developed for spinning was applied to the roving processes about 1932. Since that time it has become a major advance that has resulted in revolutionary changes in required roving processes, resulting in the elimination of a large number of the roving frames previously required.

In 1929 one process picking was introduced, and in the last ten years one process picking has practically replaced the old picking systems that were formerly considered standard and adequate. With the advancement that has been made in modern opening, blending, cleaning, and picking systems, the cotton is prepared much better, with less fiber damage, and to the subsequent benefit of later processes.

1910 and 1947 Mill Compared. The improvements made in textile machinery and manufacturing



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with the *Streamlined* eye

Work that runs smoothly is what the weaver wants—because then he is "on top of the work," not the reverse. WALKER HEDDLES give *him* that advantage, win *you* a steady, even, untroubled production because:—

1. The smooth walls of the WALKER Streamlined Eye have an accurate, pre-formed twist that lets warp yarns pass through parallel to each other, then
2. This twist of the Streamlined Eye, plus the broad base and ultra-smooth surfaces let the warp ends in other frames travel over with practically no chafing.
3. WALKER HEDDLES nest evenly, giving you uniform spacing with high count per frame. They help you get a close, even beat-up and better fabric.
4. Dimensional accuracy and design of bar slots, keep heddles in working position, reduce wear and increase working life.

The best way to find out how good these WALKER HEDDLES are and the benefits you will get from their precision and workmanship, is to equip a loom with them. Then keep a record of performance.

WALKER LOOM HARNESS

WALKER MANUFACTURING COMPANY, INC.

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methods since 1910 may be illustrated by a comparison (see accompanying box) between two print cloth mills laid out in accordance with the best practice prevailing then and now. It may be assumed that the machinery in the mill of 1910 and in the mill built today is installed in adequate buildings, properly designed for their purposes, properly lighted, and with sufficient floor space for economical manufacturing operations.

In 1910 a mill of 50,176 spindles and 1291 plain automatic looms with complementary machinery to balance would manufacture 76,762 pounds of 39" width 80 x 80 4-yard print cloth in 80 hours of operation.

Today, a mill with 46,078 spindles and 1075 high speed automatic looms with necessary complementary machinery of the latest available type would manufacture the same poundage of the same fabric in an equal number of working hours.

The 1910 mill would need 330 employees engaged in manufacturing processes, with 25,200 man hours. The 1947 mill requires 224 operatives, including supervision, with 16,600 man hours. This shows a percentage decrease in employee hours from 1910 of 34.1%; while the increase in pounds per employee hour has been 51.5%.

The factors which have contributed to the marked increase in pounds of product per hour per employee include both major and minor improvements in productive machinery and equipment, and assignment of work loads along the lines of scientific labor studies, but without materially increasing the total work load of the individual employee.

Also recognized are the contributions made by textile machinery builders in improved design and manufacture, and the developments which have been made in special types of lubricants for textile machinery, which have aided in increasing uniformity of operation in many departments.

Modern opening, cleaning, and blending machinery has taken the place of the bale breaker and cleaning trunk which in 1910 prepared the stock for the pickers. The work is done much more efficiently, at a reduced labor cost. Better blending of the raw stock in the opening and picking processes is becoming increasingly important. This is especially true in mills which run mixes of different grades of cotton. A battery of blending feeders is arranged to deliver stock to a feed table and when delivered from the end of the table is a mathematically accurate blend of all the bales.

The former three processes of picking have been replaced with modern one-process pickers, with a proportionate reduction in labor required. Although in general construction the revolving top flat card does not differ greatly in appearance from the card of 1910, it is more accurately built and retains its settings longer. Card

COMPARISON OF MACHINERY IN A 1910 PRINT CLOTH MILL AND 1947 MILL OF EQUAL CAPACITY

The 1910 mill is laid out for approximately 50,000 spindles. The 1947 mill has been planned of sufficient capacity to manufacture the same number of pounds per hour as the 1910 mill produced, using for each process the latest machinery now available. The productive machinery required is listed for both mills:

The 1910 Mill	The 1947 Mill
1 - Bale breaker	4 - Blending feeders
1 - Overhead condenser	2 - Buckley cleaners with cage sections
1 - No. 7 Exhauster	1 - Overhead condenser
1 - Distributor to picker feeders	1 - No. 7 Exhauster
3 - 2-Beater breaker pickers	1 - Distributor to picker feeders
5 - 1-Beater intermediate pickers	3 - Three-beater one-process pickers
5 - 1-Beater finisher pickers	105 - 40" Revolving top flat cards
107 - 40" Revolving top flat cards	18 - Breaker & finisher drawing frames; total 144 deliveries
60 - Deliveries of breaker drawing	41 - Long-draft roving frames of 136 spindles each, 8" x 4"
60 - Deliveries of intermediate drawing	78 - 304-spindle filling frames equipped with long draft, of 3" gauge, 1-7/16" rings, 6⅜" traverse
60 - Deliveries of finisher drawing	81 - 276-Spindle warp frames equipped with long draft, of 3¼" gauge, 1¾" rings, 7½" traverse
10 - 60-Spindle slubbers, 11 x 5½"	1 - Roving bobbin stripper
18 - 104-Spindle intermediates, 9 x 4½"	2 - Automatic spoolers, 162 spindles each
56 - 160-Spindle roving frames, 7 x 3½"	2 - Super-speed warpers, 468-end creels
112 - 224-Spindle filling frames, 2¾" gauge, 1-5/16" rings, 6" traverse	2 - Slashers
112 - 224-Spindle warp frames, 2¾" gauge 1⅝" rings, 6" traverse	1 - Stationary warp tying machine
18 - 100-Spindle spoolers, 4¾" gauge	1075 - 40" High speed automatic looms
18 - Warpers	1 - Brushing and shearing machine
4 - Slashers	7 - Inspection machines
1 - Stationary warp tying machine	1 - Hooking machine
1291 - 40" Automatic looms	1 - Baling press
9 - Burling tales	
1 - Hooking machine	
1 - Baling press	

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Pacific Mills, organized in 1853 at Boston, Mass., is one of the oldest mills in the industry . . . yet still ahead with the latest designs in improved textiles for all purposes . . . backed by a young and vigorous organization of men who know the textile business from the raw cotton and synthetics to the finished products, such as:

- Pacific Mattress Protectors
- Pacific Supersorb Towels and Wash Cloths
- Pacific Crib-Fast Sheets made with mitered covers which fit snugly around the crib mattress and eliminate wrinkling
- Pacific Silver Cloth which is available in Wrap Bags, rolls and by the yard; also as a lining in a wide range of silver chests
- Pacific Balanced Sheets and Pillow Cases

PACIFIC MILLS, COTTON & RAYON DIVISION

MILLS AT

Lyman, S. C. **Columbia, S. C.** **Rhodhiss, N. C.**

vacuum stripper systems have greatly reduced the frequency of stripping.

While the majority of the mills today use two process drawing, there are two variations which are available. These are: lap back drawing and bi-coil drawing.

Comber production is almost twice that it was ten years ago. Today, up to four pounds per hour per delivery is common, whereas, two pounds was the usual amount per delivery an hour in 1910.

Roving processes, employing drafts of from 4 to 7, and including slubbers, 1st and 2nd intermediates, and jack frames have been superseded by long draft roving frames. The long draft equipment in the spinning room has made it possible to spin from much coarser roving, and the number of roving processes has been accordingly reduced. 29s warp yarns formerly made from 5.5 hank double roving made on three roving processes can now be produced from 3.7 hank double roving which is made with but one roving process; while 40s filling yarn which has been produced from 6.5 hank double roving made on three roving processes can now be spun from 4.5 hank double roving made on a single roving process. The coarser roving, on bobbins weighing at least twice those of 1910, permits a reduction in doffing labor and handling in the card room.

Probably the most obvious general result of the installation of long draft spinning is a simplification of the card room layout, and yet this is only one of many advantages which may be brought about. In fact the manner in which advantage may be taken of the benefits of long draft spinning is more or less at the option of the mill making the installation.

Although the advantages to be gained through the use of coarser roving both in the spinning room and card room are not to be minimized, increasing recognition is being given to the definite improvement in yarn and roving quality brought about by the use of the apron drafting principle. Mills that are spinning very coarse numbers are installing long draft, even though they cannot take advantage of the full drafting possibilities, for the sake of the better fiber control. This is especially true where short cotton and perhaps waste mixes are being used, since the old roller drafting system falls down badly as far as control of the shorter fibers is concerned.

Soon after the advent of long draft spinning, it became obvious that the benefits of improved fiber control and coarser rovings could be as valuable in the card room as in the spinning room. This led to the application of the long drafting principle to the roving frames, and the combination of long draft roving and long draft spinning has resulted not only in a more economical production unit but in more even and stronger yarn.

How Long Draft Affects Organization. Merely as one example of how long draft installations can affect a yarn organization, let us make a comparison of a theoretical mill of fifty years ago and a mill of today equipped with long draft in both the spinning and carding departments. (See accompanying box on page 221.)

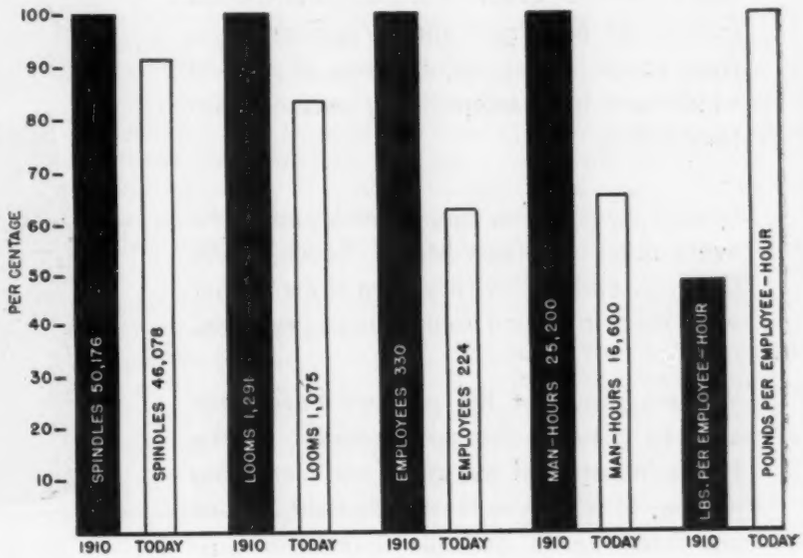
The simplicity of the 1947 organization as compared to that of the 1900 mill is at once obvious. Instead of three roving processes, there is only one. Instead of 44 frames, there are only 15. This, of course, represents not only a simplification of the card room layout, but produces an appreciable reduction in labor requirements, oiling, roller covering, repairs, depreciation, etc.

In addition, the net weight on a spinning bobbin will be approximately 2.82 ozs. as against about 1.65 ozs. on the old frames. Consequently, doffing will be required much less frequently, and the greater length of yarn on each bobbin will increase the efficiency of the spooling operation.

It is not difficult to see why the 1900 mill would find it impossible to offer serious competition to the 1947 mill.

Synthetic Fiber Processing. The increased use of synthetic fibers of greater staple length has introduced new problems for the spinner. To meet these problems the textile machine shops have been called upon for aid, and they

Graphic illustration of machine and employee efficiency in 1910 and today. Type of fabric produced, number of pounds produced, and number of hours of machinery operation are the same. Note the increase in pounds per employee-hour. Decrease in employee-hours since 1910 is 34%. (This is a percentage chart.)



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Photos of typical Robbins Flooring in Textile Mills

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MILLIONS WALK DAILY ON ROBBINS FLOORING

have responded with specially designed drafting systems, roll stands, and top rolls to accommodate the longer staples.

Mixed staples were the nightmare of spinners thirty years ago, but today, twisters are designed especially to handle synthetic fibers. Full roller cards have been designed for rayon, and wider spaced rolls on drawing, roving, and spinning will accommodate blended staples up to 3″ long. These have all helped to eliminate many of the earlier problems found in the processing of mixtures and longer staples.

Due to many apparently minor improvements in machine construction, the number of ends down per hour per thousand spindles has lessened, and an operator can without greater labor take care of more spindles. Among the factors which make this condition possible are:

Tape driven spindles, which give a more constant speed and less variation in twist, produce yarn of more uniform strength, and with correspondingly less end breakage. Wider gauge frames have eliminated the need for separators, and without the disadvantage of whipping of the yarn against the separators the yarn strength is not weakened. Better spinning rings and travelers and controlled humidity in the carding and spinning rooms contribute also to the additional strength of the yarn and to better running work.

Large Packages. Larger packages on the spinning frames reduce doffing time and increase general machine efficiency. Improvements in spindles and general machine construction, better lubrication and precision in manufacture, better builder motions, the more prolific use of cut gearing and anti-friction bearings have made it possible to increase frame speeds without sacrificing efficiency or increasing employee work loads. The combination of all these has made it possible to spin soft twisted fine yarns on ring frames which in 1910 were spun on mules.

Larger spinning bobbins enable the mill to spool their yarns on either old or new type spoolers more economically than was possible in 1910.

There have been two distinct developments in spooling equipment; the automatic spooler, on which all knots are tied by the machine itself, and high speed tube or cone winders, which have reduced labor costs, and put the yarn in suitable form to obtain high speed warping economies in the succeeding operation.

Improvements in the spinning frame have permitted the spinning of filling yarns onto longer and larger diameter packages than those capable of being used in the loom shuttle. In addition to larger package spinning bobbins, there are a number of other types of yarn packages that are not adapted to weaving and must be rewound. Rewinding is an auxiliary operation which is essential, but it must be accomplished at a low cost per pound. Also, the rewound bobbin produced should be firmly built and well shaped to get the utmost out of yardage and good yarn in the weaving operation. The automatic filling winder has stimulated large package spinning and twisting.

High speed warpers have been developed for both types of spooling packages. Warper speeds which were low in 1910 have been increased with modern warpers up to from 350 to 900 yards per minute, depending on the type of warper and the size of yarn processed. Tension on the yarn wound on the section beams is more uniform, which reduces end breakage both on the warper and in subsequent operations. Magazine creeling permits continuous operation of the warpers and a resultant reduced warper tender cost per pound.

Larger packages that are used in the creel materially reduce the cost of creeling. Section beams used on the warper contain much greater yardage, which lessens the doffing costs on the warper and also effects economies in the slashing department.

Since 1910 a portable warp knotting or tying machine has been developed and is in use in many mills. In some mills this has replaced the stationary warp knotting machine. The advantage of the portable machine is that it is not necessary to remove the reed, harnesses, or drop wires from the loom. The empty beam is replaced by a full beam, and the old lease is tied to the new warp. The labor cost of removing the old lease, setting in the new reed, harnesses and drop wires, and necessary adjustments is a direct saving.

Slashers. The productive speed of slashers has been greatly increased, particularly during the past two years. Section beam

HOW LONG DRAFT AFFECTS YARN ORGANIZATION

1900 Mill	1947 Mill
Yarn - 29s warp	Yarn - 29s warp
Spinning draft - 10.54	Spinning draft - 18.75
Spindles per frame - 224	Spindles per frame - 276
No. of frames - 112	No. of frames - 83
Production per 80 hrs., 46,500 lbs.	Production per 80 hrs., 46,500 lbs.
Specifications:	Specifications:
2-3/4" gauge, 1-5/8" ring, 6" traverse	3-1/4" gauge, 1-3/4" ring, 7-1/2" traverse
Fine roving (7x3½) 5.50 hank (Dbl.)	Long-draft roving (8x4x7)-3.20 hank (Dbl.)
Fine roving draft, 6.11	Long-draft draft - 23
Spindles per frame - 160	Spindles per frame - 138
No .of frames - 29	No. of frames - 15
Intermediate roving (9x4½)-1.80 hank	Finisher drawing sliver - 60 grain
Intermediate roving draft - 5.14	
Spindles per frame - 104	
No. of frames - 10	
Slubber roving (11x5½)-0.70 hank	
Slubber roving draft - 4.20	
Spindles per frame - 68	
No. of frames - 5	
Finisher drawing sliver - 50 grain	

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COLUMBIAN "NYLON" MULE ROPE.

creel stands are now available on a traverse track, and the time required to change sets is greatly reduced. The drying capacity of the cans has been increased, and the method of removing the condensate greatly improved. A device has been developed for maintaining a pre-determined stretch of the yarn through the slasher.

With the many improvements that have been incorporated in the most modern slashers, at least double the amount of work can be processed that could be obtained in 1910.

In 1939 the Whitin Machine Works introduced the manufacture of high speed warp knitting machines to America. Subsequent research developed improvements and refinements which not only increased the number of courses knitted per minute, but also produced new knitters capable of handling the new synthetic fibers that appeared in the knitting field.

In the early forties, interest commenced to increase about the processing of worsted yarns on cotton machinery. Following some experimental work, the equipment selected by some mills to process worsted yarns was: first, drawing arranged in three processes, second, long-draft roving, and third, long draft spinning.

Drawing frames were designed to handle the worsted yarns and the roving and spinning frames were equipped with special large rolls, roll stands, and cradles. Today, there are approximately one hundred thousand spindles operating in nineteen mills processing worsted fibers on cotton machinery. The potential capacity of these mills on 30s worsted yarn is 18 million pounds per year on a two-shift basis or 80-hour week.

In the cloth room there have been many important developments and improvements. A high speed automatically controlled shear and brushing machine is used; new inspection machines reduce manual work of the burlers, and make it possible to obtain a more careful inspection of the fabric.

Auxiliaries. Roving bobbin and filling bobbin cleaning machines have been developed which reduce the labor required for this work. Controlled humidification of all departments has provided constant moisturizing which provides for uniform operating conditions. Individual or group motor drives permit flexible control of machine speeds. Modern lighting fixtures reduce operative fatigue, while recently developed gloss paints have also improved lighting conditions.

Compressed air is now used for machine cleaning, in place of wiping cloths and brushes. Special-purpose oils and greases have been developed which have improved lubrication and reduced frequency of oiling.

New materials are being used in the construction of textile equipment. Some of these are. Steel ring rails are replacing cast iron ones, magnesium is used for ring rails on spinning and twister frames processing synthetic fibers, plastic for guides, tubes, etc.; nylon for travelers, extruded aluminum parts are being used for lightness and high tensile strength. Oilless bearings and special steel alloys are being employed to meet many specific requirements.

INTERESTING FIGURES ON PROCESSING EQUIPMENT.

(Based on February 1942 inventory by Bureau of Census)

Of 899 mills inventoried, 236 used one-process drawing, 614 used two-process drawing, and 27 used both one and two processes.

Of the 90,582 cards, the production in pounds per hour for number of cards was as follows: 7 to 9 pounds per hour, 41,607 cards; 10-12 pounds per hour, 28,291 cards; 13-15 pounds per hour, 16,081 cards; and 16 pounds and over, 4,065 cards. Production for 538 cards was not reported. (Figures for week of Feb. 22-28, 1942.)

Of the 637,529 slubber spindles, 335,138 were long draft; 302,391 were regular draft. Of the 700,060 intermediate spindles, 188,660 were long draft; 511,400 were regular draft.

Of the 24,185,947 spinning spindles inventoried in February 1942, there were 12,419,642 long draft and 11,766,305 regular draft. 12,199,641 were tape driven and 11,986,306 were band driven.

Loom figures. Number of looms in widths from 22 to 34 inches were 34,825; 36-inch looms, 45,892; 40-inch looms, 211,519; from 44 to 60 inches, 116,963; 64 to 100 inches wide; 43,752: over 100 inches wide, 645. About 14,056 looms were not specified as to width. There were 371,923 plain automatic looms without drop box; 14,963 plain automatic looms with drop box. There were 24,372 plain non-automatic looms; 97,119 equipped with dobbies; and 13,750 Jacquard looms.

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Woolen Machinery Development

By ARTHUR W. REYNOLDS
Davis & Furber Machine Co.

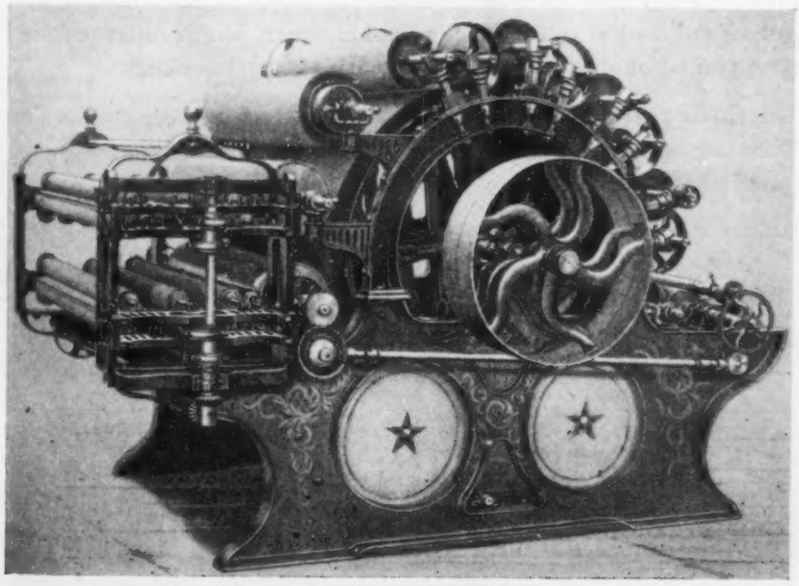
Developments in woolen machinery have kept pace with the problems of a rapidly growing country. Future may bring rapid changes.

ONE-HALF CENTURY in the carded woolen industry is not long, yet the last fifty years have brought about machine developments which have participated in the major growth of our industry and have given it a sound basis in the economic status of the nation. Specifically, woolen machinery has kept pace with the problems of a rapidly growing country, the sharp increases in wages, shorter hours for labor, and distribution of social benefits.

A brief resume of factual developments will indicate why this is so and in what manner it has come about.

A student of machine design and construction must not overlook the premise that the carded woolen process is, in fact, a most flexible one, and that wool and a wide variety of blends of wool and other fibers, both animal and vegetable, and with greatly varying fiber diameters, characteristics and lengths, can be and commonly are processed from the raw state to finished yarns by this means. The very flexibility of the process and its abilities is at once an economic boon, yet something of a hindrance to more rapid and specific mechanical progress.

View of the driving side of a Davis & Furber finisher wool carding machine built around 1865. Note 9-roll condenser at left.



Picking. Basic design of picking and blending machines for wool and wool stocks was developed many years ago. Thus, advance is now to be considered more in the light of utilization of improved, modern pickers than in any alteration of their essential design. Actually, picking of wools, following the scouring and drying processes, represents a broad classification comprising opening, cleaning, and blending, and, thus, presenting the final preparation of stocks for carding.

Improved structural materials and engineering thought have increased unit picker production through the machinery manufacturer's ability to design superior and larger pickers. Modern pickers are larger, with shafts of greater diameter and of better steels. Cylinders are now of steel construction rather than of cast iron,

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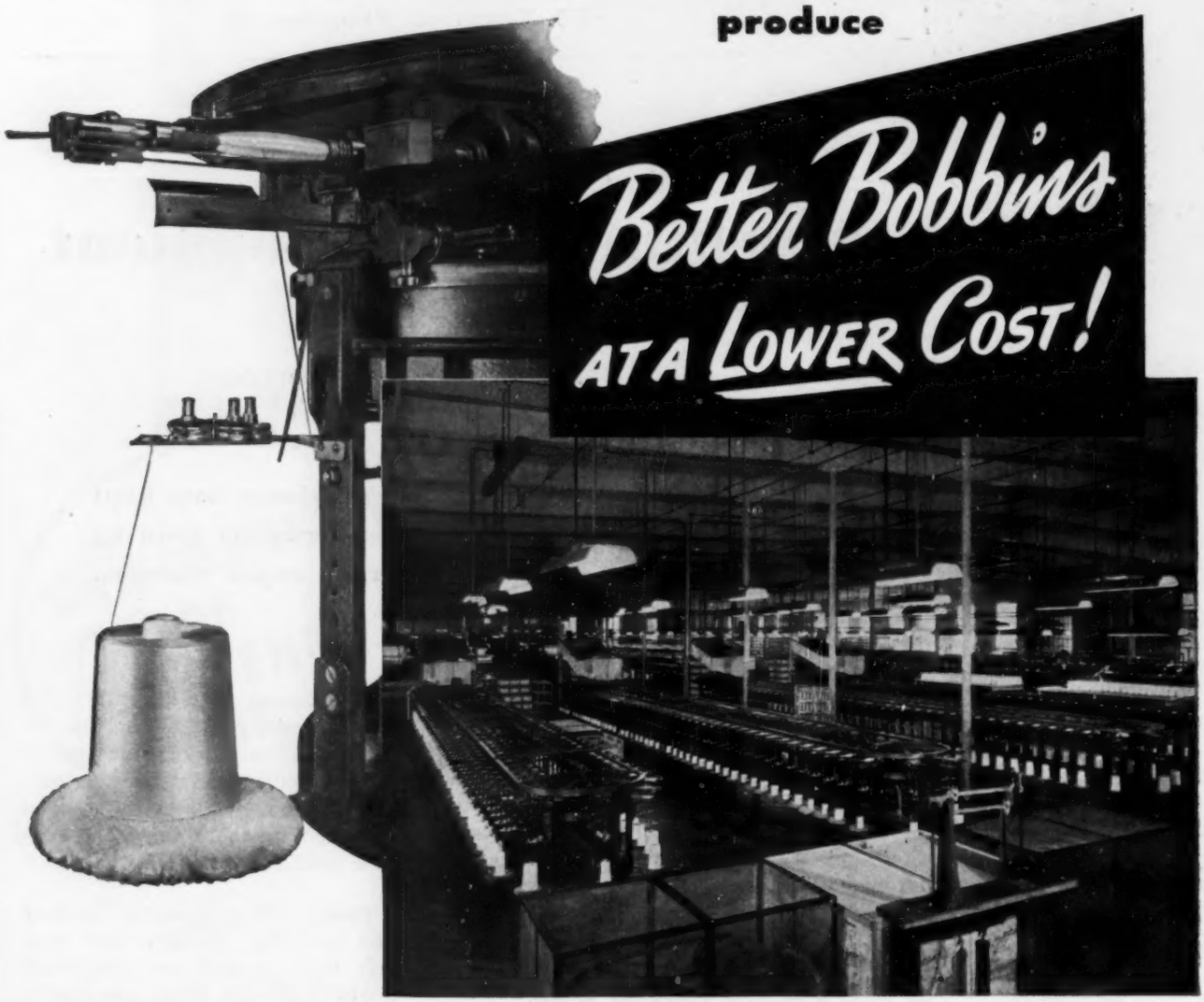

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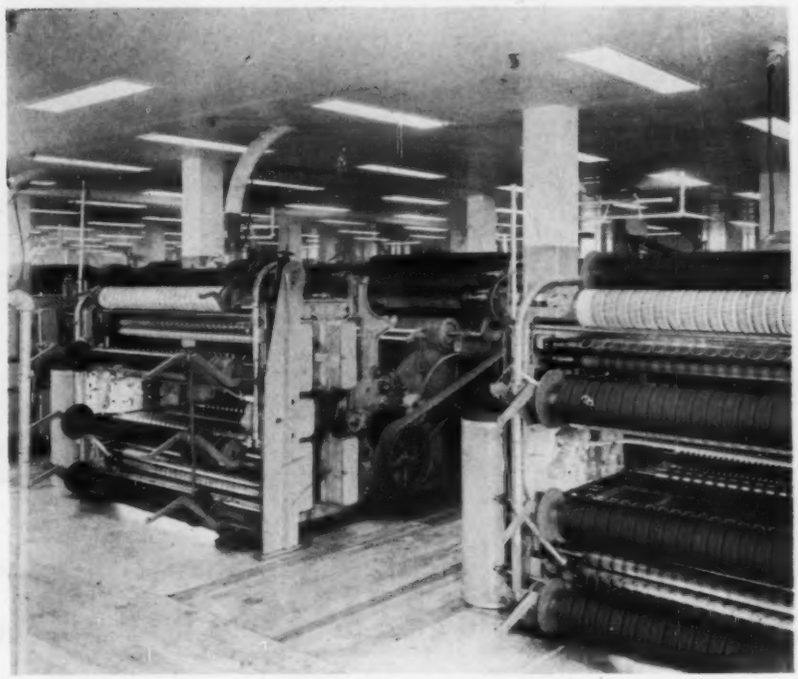
and bearings of the ball or roller type have replaced those of the bronze or cast iron.

Forged steel teeth mean longer wear, less replacement, and more uniform picking and blending results. Greater accuracy of feed roll and cylinder settings, simplicity of speed changes for feed aprons and feed rolls, both add to the capabilities of the modern picker. Additionally, suitable screens or under grids assist in removal of foreign materials and permit easy cleaning of the machine.

As is obvious, the aim is for a definitely improved picking, cleaning, and blending of the wools; and it is fair to state that progress, as outlined, has been made in Fearnought and mixing pickers, burr pickers, wool openers, and both cone and box dusters.

Processing costs have been steadily reduced by the use of modern picking machinery in a planned system or method whereby the pickers, feeds, weighing, oiling, and blowing devices are so arranged as to eliminate excess handling costs, and also reduce the element of human variation or "guess work" in preparing the blend. Basically, the problem is one of preparing and maintaining quality and uniformity of blend, and by the use of modern machinery and planned method, this can be accomplished with a high degree of accuracy and at low poundage cost.

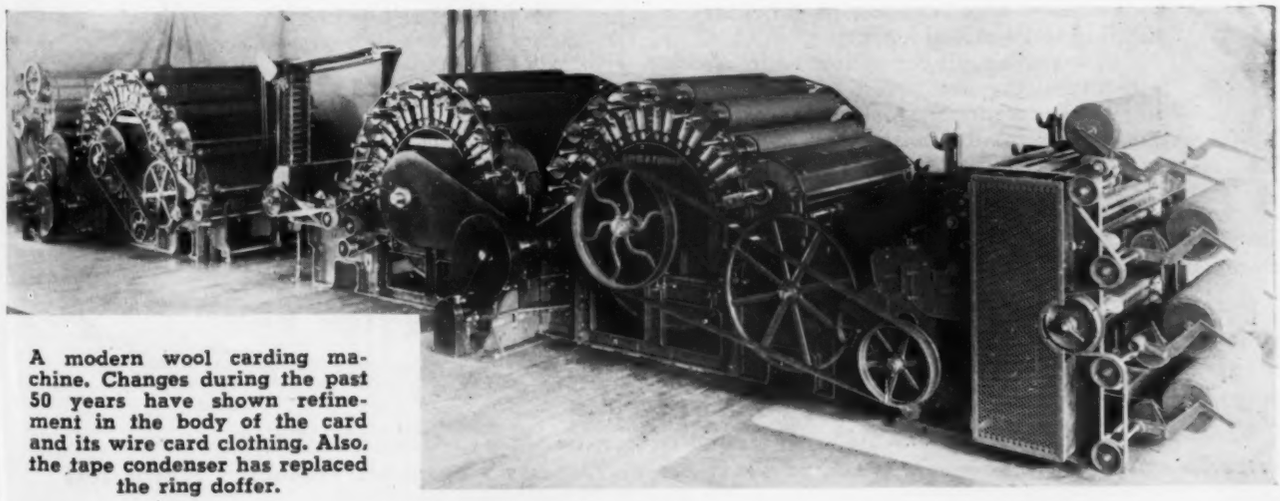


Scene in card room in modern woolen mill. Note fluorescent lighting

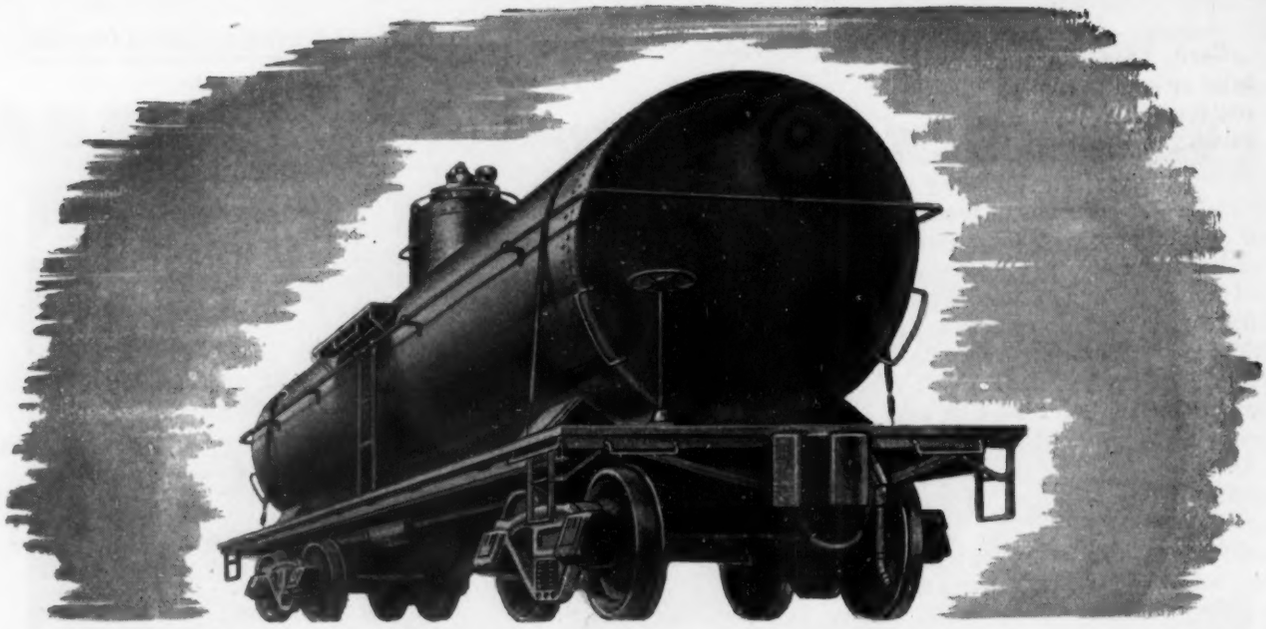
Carding. The carding of wool is still largely based on the variability of the material to be worked, and the process is carried on by a carding machine designed and constructed to meet the industry demands in preparing a wide range of wools and rovings for the spinning operation.

Changes in the past fifty years in the carding machine have shown refinement and improvement in the body of the card and its wire card clothing; plus a distinct change in the method of dividing and condensing the carded web; namely, the tape condenser as a replacement of the now obsolete ring doffer method.

Woolen cards have tended to increase in size, 48-inch widths giving way to 60 inches and now to 72 inches and, in limited numbers, to even greater widths. Diameters have become greater and are now standardized at 60 inches. The increase in size of cards, demand for improvement in quality of roving and for greater poundage production per unit, have all been motivated by market requirements and cost factors; these have been met by improved materials and engineering progress, thus to cope with the problem.



A modern wool carding machine. Changes during the past 50 years have shown refinement in the body of the card and its wire card clothing. Also, the tape condenser has replaced the ring doffer.



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Twitchell 7410 Wool Oil and Twitchell 7420 Worsted Oil, for lubrication in carding, combing, spinning and weaving operations, are finished oils ready for use, self-emulsifying, easily scourable. Twitchell 7430 most readily scourable oil available.

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Non-staining Twitchell Oil 7250 for all finishing, produces fastest rewet, softest hand. Oil 7240 for fast wetting back, medium hand.

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Emersols 211 & 221 Low Titre Elaines
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Hyfacs 410 & 420 Hydrogenated Tallow F. A.
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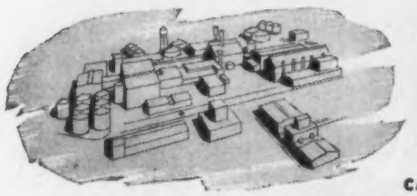
Descriptive literature—full specifications on request.



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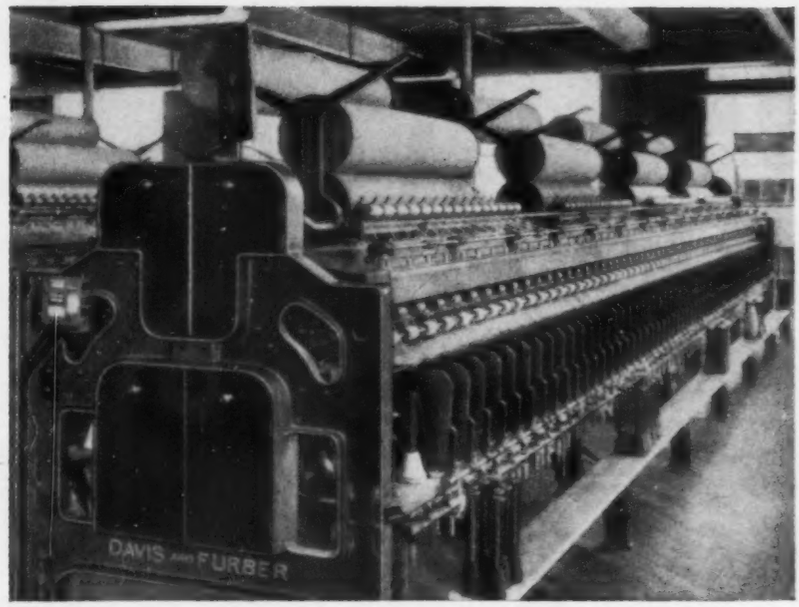
Card Feeders. We cannot, in brief space, encompass in detail all improvements and progress in carding machine design and construction. Automatic card feeders have by necessity grown in size and capacity. The major problem, with the sharp increase in unit card production, has been to accomplish even and constant-fed weights to the card. Uniformity of feeding has been brought about by progress in design of the feeder, and the maintaining of such uniformity by accuracy of construction and the ability of the feeder to have suitable adjustments made and kept under the stress of mill productive conditions.

Burring breasts, wound with hardened-point metallic wire, are definitely a part of the modern woolen card. By the use of the breast, a more final opening of the stock is offered before the cylinder, and removal of a large percentage of foreign material thus protects the card clothing and improves the processing. Modern breasts are built with suitable arch construction, allowing accurate roll setting, and rolls are driven with chains and sprockets for positive speeds.

Carding machines are now of all-metal construction and employ modern steels, alloys, and light metals, as well as cast iron. The increase in size has developed engineering progress, and, in turn, this has brought about greatly improved design in arch construction, settings of rolls, drives, bearings, and in the card clothing with which the various rolls are wound. Speeds and feeds have increased substantially, but not at the expense of quality and evenness of carding. The combined use of modern materials and properly engineered design have provided the dual advantage of accuracy of carding and poundage production increase.

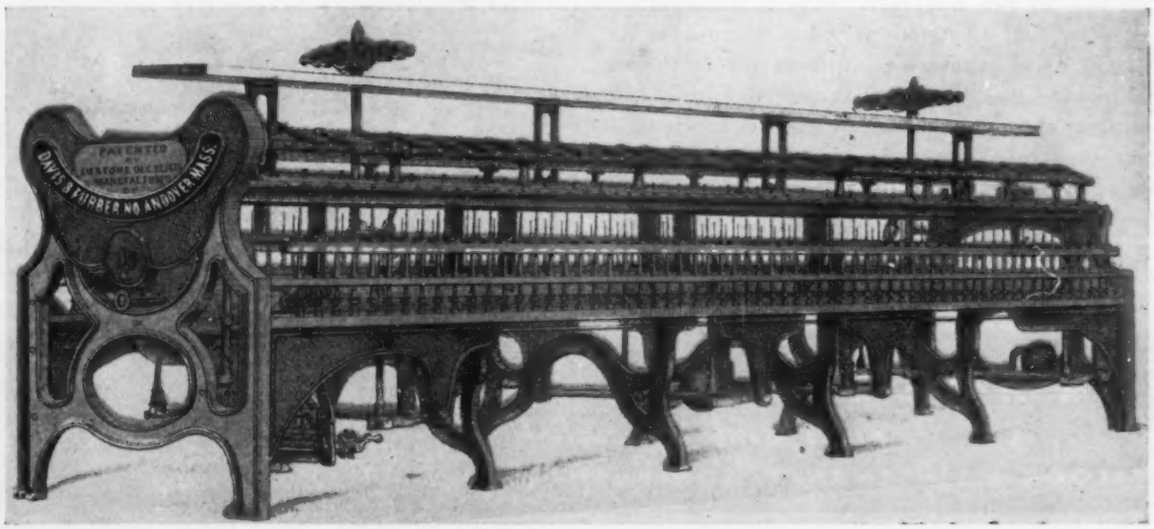
Apperley and camel-back type intermediate card feeds have given way to the simpler and more accurate center draw broad band intermediate feed. The result shows itself in superior carding, less variation in roving weights, and freedom from trouble in daily operation.



Modern woolen spinning frame of 6½-inch gauge. The frame built 25 years ago was equipped with rings 2½ inches in diameter and a gauge of 3½ to 4 inches.

Tape Condenser. Prior to the advent of the tape condenser, the ring doffer system was utilized to divide the web from the finisher carding machine, and the thus divided web was commonly rubbed or condensed into roving strands.

A ring spinning frame of the 1875 period.



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Clean floors—so important to worker safety and morale—reflect good management. Large-area floors that are cleaned with a *Finnell Combination Scrubber-Vacuum* reflect good management for still another reason. They tell a story of big savings effected in labor costs. For example, the *Finnell Scrubber-Vacuum* illustrated above, with one or two operators, does a cleaning job better in half the time it takes a crew of six to eight using separate equipment for scrubbing and picking up. This *Self-Propelled Finnell* is a complete cleaning unit *all in one*—it applies the cleanser, scrubs, rinses if required, and picks up. Has a cleaning capacity up to 8,750 sq. ft. per hour!

Finnell offers several *Combination Scrubber-Vacuum Machines*, and also a full line of *Portable Floor-Maintenance Machines*. In fact, *Finnell* makes equipment for every type of floor care—wet scrubbing, dry scrubbing, dry cleaning, waxing, and polishing—and in sizes designed to fit specific needs. *Finnell* also makes a full line of *Cleansers* specially developed for the greater speed of mechanical scrubbing . . . and *Sealers*, *Waxes*, and *Accessories* for every need.

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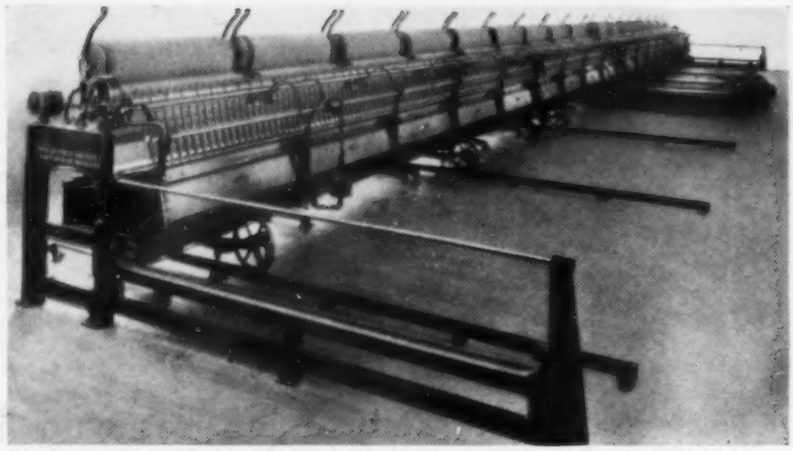
BRANCHES IN ALL PRINCIPAL CITIES

The tape condenser immediately demonstrated its inherent ability to divide and condense a greater number of strands of roving and to take the web from the card suitably with one doffer cylinder, thus eliminating the unlike characteristics of "tops and bottoms" in the roving. With the limitations in dividing and condensing largely removed, and with proof that most cards could handle a greater stock load, the tape condenser was the primary means of increasing card production from 20 to as high as 60 or 70 per cent. Of distinct interest is the apparent fact that the roving thus produced is of a superior quality for spinning.

Individual motor drives offer flexibility of machine operation, a freedom from overhead shafting, and more accurate machine performance. These factors warrant the expense of installation and maintenance, and the tendency is now to complete individual motor drives on all machines.

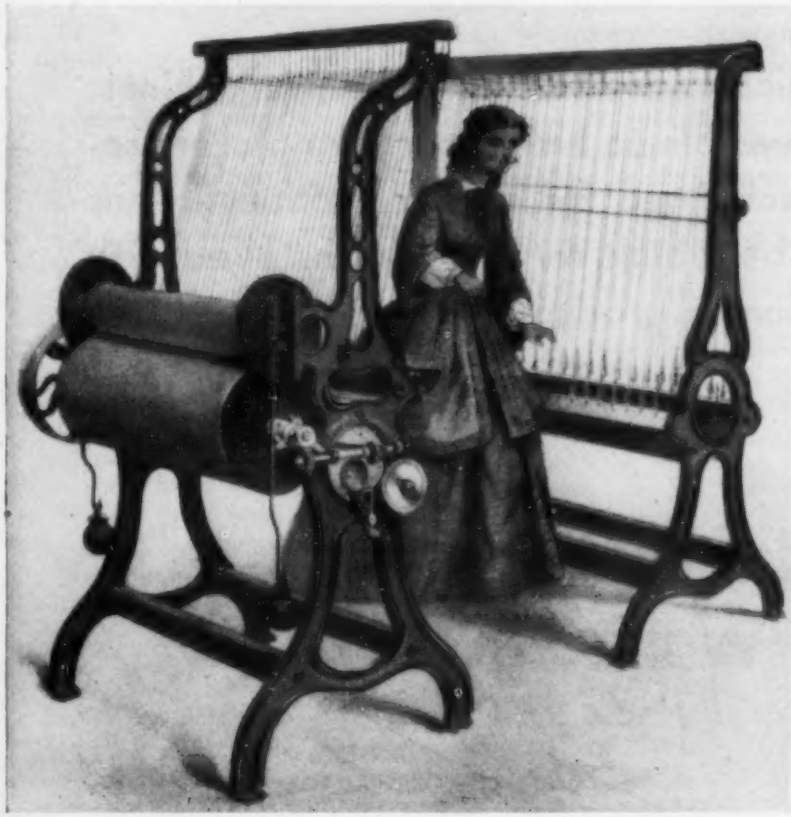
In most instances, the improved automatic card feeders, metallic breasts, intermediate feeds, and tape condensers could be installed on already existing carding machines, with the only major limitation being floor space. Thus, mills have had the opportunity of modernizing their cards as conditions permitted.



"The salient change of these past years has been the gradual (at first) and now rapid replacement of the spinning mule by the large-package ring spinning frame."

Spinning. Under the carded woolen system, yarn spinning is carried out in one operation and directly follows the carding. The salient change of these past years has been the gradual (at first) and now rapid replacement of the spinning mule by the large-package ring spinning frame. Much space could be devoted to the subject, but the definite answer is predicated upon economy and efficiency of operation, thus, lower cost.

The woolen spinning frame of twenty-five years ago was approximately two and one-half inches in ring diameter and three and one-half or four-inch gauge. Today the common ring size is five-inch diameter and six and one-half-inch gauge, although three and one-half, four, and four and one-half inch diameter rings are in use on very fine yarns. Spinning speeds up to 200 rpm of a one and one-quarter-inch diameter production roll are attained on some carpet yarns with slack twist, while finer clothing yarns are spun at spindle speeds in the 5,000-6,000 range. Design and research are constantly being applied for the end purpose of increasing these speeds, partic-



The only clue that we have with regard to the date that the photo of this dead spindle spooler and bobbin stand was made, is the attire of the operative

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ularly on the five-inch diameter ring frames.

The large package of spun yarn, free from knots, thus produced, the employment of female spinners, economies of floor space, and continuity of spinning operation have clearly demonstrated the worth of the modern woolen spinning frame. Its cost-saving factors are indicated in the spinning process itself and emphasized in the ensuing processes.

Warp Preparation. Warp preparation in the carded woolen mill is now, under the modern scheme, divided into two types, both sectional warping, and usually without starch or sizing. The smaller mill, or the mill making short lot, fancy-pattern fabrics follows the course of jack or warp spooling from the spun yarn package and then the dressing of the sectional warp from the jack spool through to the loom beam.

The larger mill now uses this method, but concentrates its warping production in the direct, high-speed, sectional warping from the large frame-spun yarn package. One operation is eliminated, and the elements of speed and efficiency of process have combined to make this method a highly successful one.

In both cases, the machine advances have, through engineering design and use of materials, produced a more perfect loom beam at a lower cost in labor and in waste —thus offering the fabric manufacturer a warp beam in step with the demands of the modern, high-speed loom. Weaving efficiency is required and is definitely assisted by the quality of the spun yarn and its preparation into a sound beam.

Re-Wound Filling. The same factors hold in preparing the filling package, and, although much woolen yarn is spun directly onto loom bobbins on the mule, the tendency is now to re-wind the spun package from frame or mule by means of the efficient automatic filling winder. Again the answer is economy and a superior filling package. The automatic filling winder, developed in Europe and the United States, falls in line with large-package spinning and, with the above-outlined warp preparatory method, completes the yarn processing to the weaving stage.

Much more detail of the step-by step factual development of carded woolen machinery could be brought out. The industry is an old one, and cooperative effort has taken place among machine builders and woolen manufacturers over a long period of time, both in this country and in Europe. Thus, radical changes are difficult to attain, particularly in view of the fact that the fiber to be processed—wool—embodies a wide range of varying types and characteristics. The machinery must, in most cases, retain a degree of flexibility sufficient to cope with changes in the demands made upon it, and yet produce blends, yarns, and fabrics consistent with the woolen industry's position in our economy.

Costs. A brief view of the years since 1938 will emphasize the importance of the machine factor in the production of woolen yarns and fabrics, and in the maintainence of a reasonable cost level for such fabrics. In these years a study has shown that woolen manufacturing wages have increased approximately 170 per cent—cost of construction, between 80 and 85 per cent—fuel oil, 115 per cent—and wool, in excess of 60 per cent.

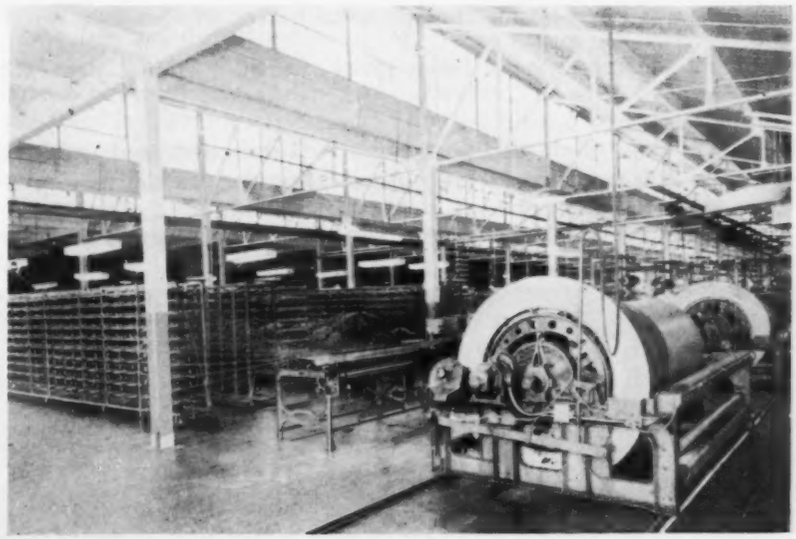
We believe it essentially American in spirit to think that progress is desired, planned, and worked out to the advantage of the country. Machine changes, developments, and improvements in the carded woolen industry have taken place in a major way in the past fifty years—and there is no doubt that the future will bring about even more rapid changes. Advanced textile education and mutual understanding of the industry problems among mills and machine builders, enable us to look and move ahead.

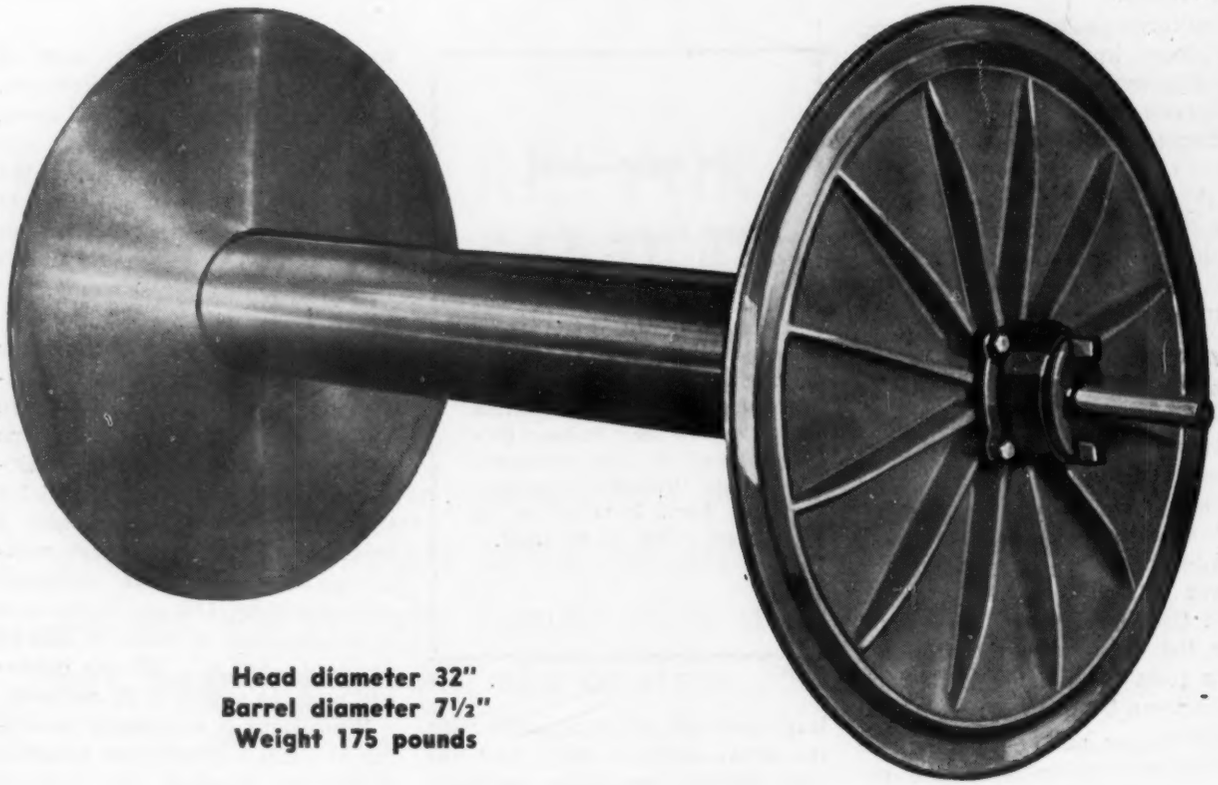
In Retrospect

(Textile Industries, March '10)

An interesting solution of the problem of intercommunication is furnished by a big cotton yarn mill at New Bedford, Mass. Messenger boy service and speaking tubes now seem to have given way to the telephone method. Telephone stations have been installed at 31 central points in the mill.

High-speed sectional warp dressing reels in a large carded woolen mill.





Head diameter 32"
Barrel diameter 7½"
Weight 175 pounds

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The Noble comb achieved prominence during the latter part of the 19th century.

50 Years of Progress in

Worsted Machinery Development

By HAROLD V. FARNSWORTH
Atkinson, Haserick & Co.

IN AN ARTICLE discussing progress and advancement in worsted machinery for the past half-century it is imposible to make a very close and specialized study of all mechanical developments, and the reference can be but brief because such a wide variety of machines is employed in producing worsted yarns.

Wool Opening. The large wooden lagged cylinder opener with a stripping beater and the cone duster have been replaced by single or double cylinder openers with a fan, which has a kinder action on the grease wool, preparing it much better for the washer.

Washing. The original models of wool washers were very crude and merely performed the washing process without adequate measure of control over either the production or handling of the stock. Modern machines are wider, and full use has been made of stainless steel, with all the controlling mechanism being below the top of the bowls, thereby permitting rapid inspection of the progress of the wool. Overhead gearing is eliminated, and settling tanks extend the full length of the bowls. The squeeze rolls are rubber covered and hydraulically weighted. Automatic temperature controls keep the bath at an even and predetermined temperature. In general, the machine handles the stock gently and gives a clean white wool in an elastic, open, and lofty form, resulting in an enhanced quality of top with no damage to the natural properties of the fiber.

The naptha process of wool scouring was developed about forty years ago and is used in one large mill today.

The dessuinteuse is used on the Continent. The wool traveling on a perforated apron passes under a series of sprays of hot water, and much of the suint and accompanying dirt is removed. The dessuinting is also accomplished by adding a fifth bowl to the normal four bowl washing train.

Drying. The earlier types of drying machines, while varying in method of operation and construction, were all "bakers," and there was no certainty as to the dryness of the wool produced. With the advent of fin type heaters, more effective insulation, thermo-

Developments in opening, washing, drying, carding, combing, gill boxes, drawing, roving, cone drawing, spinning, twisting, and reeling.

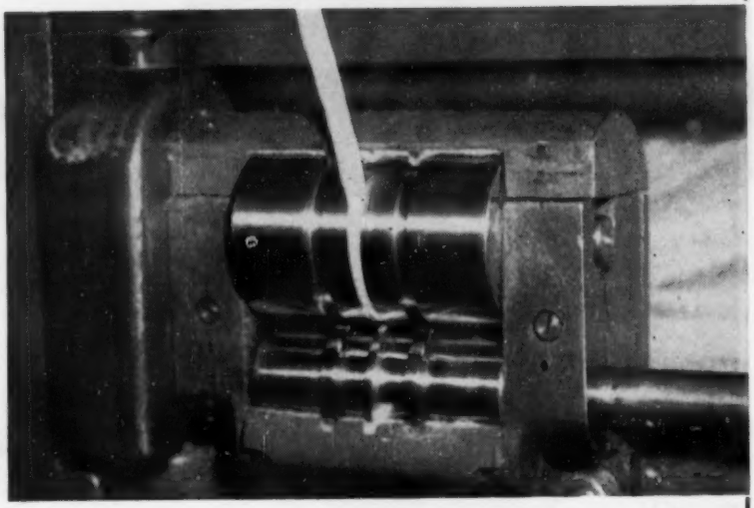
A *Sane* and *Safe* Way to Put *More* Sliver into Your Cans

The grooved calender rolls shown are the answer to a problem facing every mill today, viz: how to get more sliver into the can without damage to the sliver or card. To accomplish this requires a pair of rolls of a special design made of the proper materials machined to precision limits.

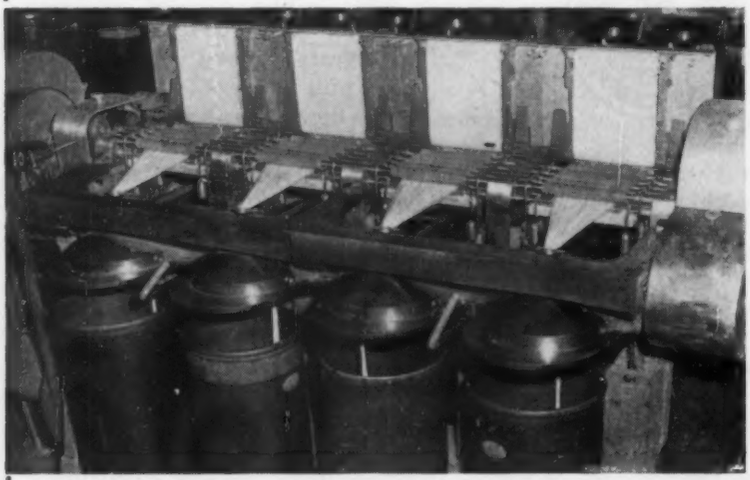
These rolls will put *every ounce* of sliver it is possible to put into your cans, without damage, and, will actually improve the quality of the sliver at the same time, and, *will not* put any additional load on the card or bearings.

Let us prove this in your own card room

(Application for Letters Patent Pending)



YOU, TOO, CAN ELIMINATE ONE PROCESS AND STILL MAKE HIGH QUALITY SLIVER



This battery of drawing frames in a prominent Alabama Mill we have rebuilt and changed from 4 roll to 5 roll with a range to handle staple lengths up to 2".

Provision was also made for 8 ends up and a draft of 8". Evenness tests show an average variation of 14%. Many mills now running 2 processes of drawing could, by converting as above, eliminate one process and still make high quality sliver.

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static controls, and efficient blowers, various systems of air circulation have been devoloped which insure perfectly dry material with a low steam consumption.

Carding. Carding engines for either the Bradford or French system have been widened from 48 inches to 60 inches, and the cylinders are now made of iron instead of wood. Morelle rolls, which are covered with the fine saw-toothed wire, are sometimes applied to remove whole burrs. The Harmell burr crusher roll crushes the burrs so that they may be more easily removed in the combing.

Rigid steel wire has replaced some of the flexible cloth-back clothing, giving greater production per card, but the advantages are still a controversial subject among carders.

The card feeder has been improved and streamlined. Electric controls aid in insuring more uniform weighing of feeding apparatus. Anti-friction bearings have been applied to most of the shafts, thereby reducing the horsepower required to start and run the card.

The side frames have been redesigned to make the machines easier to keep clean. Automatic card stripping reduces the time of stoppage of the machine for this operation, thereby increasing the production.

For burry wools the twin burring card divides the wool at the feed end so that the apparatus for removing the burrs works on only one half the weight of stock, permitting more effective removal of these impurities. A card incorporating the twin burring feed end and two sets of 30-inch diameter cylinders, superimposed on each other, with two sets of workers and strippers on each cylinder, two doffers, and one balling head, giving increased production, has been used by one mill for several years.

Combers. The Noble comb really achieved prominence in the latter part of the 19th Century. The most striking features were the solidity and the adoption of ball bearings for the carriages, which gave higher speeds and greater machine efficiencies. Later, such features as high speed dabbing, split pillars for the easy changing of circles, drawing off stands insuring minimum of wear on leathers due to even pressure applied, circle cleaning devices, automatic feed knives, and stop motions all assisted in the production of a higher quality top.

The Holden comb is not in general use today, but was used for combing fine merino and fine crossbred wools. It is claimed that this manner of combing imparts a particular luster and smoothness to the top that is not obtainable on other types of machines.

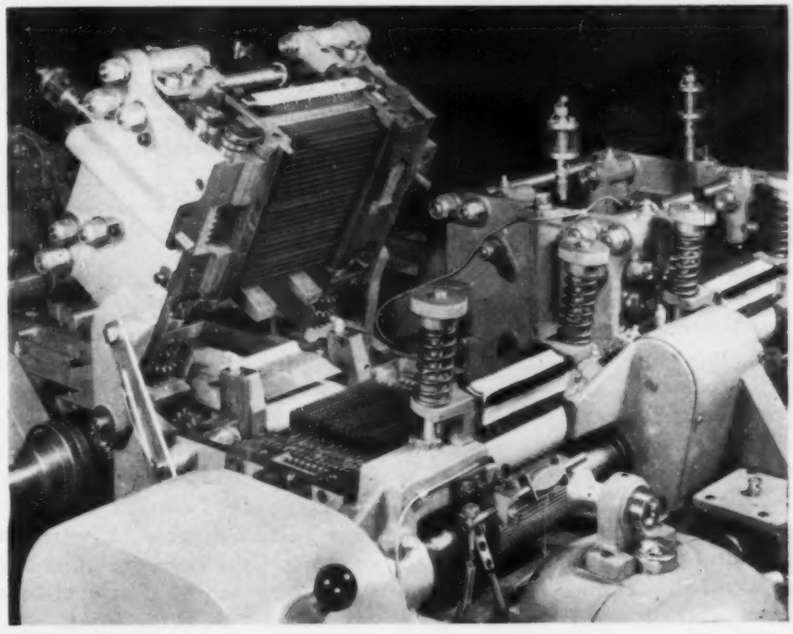
The Lister comb is used for mohair, alpaca, and luster wools which are to be spun into yarns for linings and bright goods. There are a very limited number of these machines in use today.

The rectilinear comb has been greatly improved since the Offerman Ziegler-machine of fifty years ago. The PLB model introduced in 1903 is still used by many mills. This same model has been redesigned by widening the combing surface of the machine from 14 1/16 inches to 19¼ inches, increasing the production from approximately 14 pounds to approximately 22 pounds per hour, with equal combing efficiency and results.

The SAG model differs from the PLB in that it has an oseillating nipper and a fixed system of detaching. Its combing width is 20 inches, and it produces approximately 22 pounds per hour. This type of comb is slowly replacing the Noble comb, as it gives a clearer top with less noils, and is more suitable for the shorter wools which are in greater demand for the types of fabrics being made today.

Backwashing. Modern machines are wider, increasing the production from 250 pounds to 500 pounds per hour. The squeeze rolls are rubber covered and hydraulically weighted; automatic temperature controls keep the bath at an even predetermined temperature. Most progress has been made in the dryers for the backwasher. The earlier type of dryer consisted of a series of uncovered

Photo courtesy, Warner & Swasey Co.



View of the intersecting faller head section of the gillbox introduced last year and known as the pin drafter. The section is 5 inches wide and 7½ inches long, with intersecting fallers spaced at 5/32 inch. There are 74 fallers incorporated in this machine. Flat pins are soldered to the faller bars.

rollers which were steam heated, and the control of temperature was extremely difficult.

The contact system of air drying has been substituted by perforated cylinders, aprons, or festooning the slivers over bars, using hot air in place of direct metallic contact as the drying medium. The flow of air is controlled by means of fans, and the saturated air is extracted by the same means. The walls of the dryer are lined with insulating material, and all fans are individually motor driven.

Bradford System

Gillboxes. One of the outstand-developments has been the introduction of the intersecting principle to the regular English or Bradford gillbox, not only in worsted drawing but also in combing plants. There is a greater control of the short fibers with the intersecting system, and back draft is eliminated as there is adequate pin control. The intersecting principle of action insures that the slivers enter the fallers in a free and open state. The productive capacity of the intersecting gill box is higher than the ordinary machine because it can be loaded up more heavily, and there is no danger of the wool riding over the pins. Increased draft can be applied due to the freer flow of fibers, and therefore increased doublings for the purpose of obtaining more regular slivers is a considerable addition. Particular attention has been paid to high speed screws, cams, and fallers which are the life center of the whole machine.

Last year a type of gillbox called a pin drafter was introduced to the worsted comber and spinner. In this machine the conventional back rolls are omitted, and feeding is done by means of a synthetic rubber apron. There are 74 instead of 39 fallers incorporated in the machine, and flat pins soldered onto the faller bar are used instead of round pins put in drilled holes. A synthetic rubber covered top front roll is used instead of a fluted metal top roll, with a leather apron and a cotton can coiler being adopted at the delivery end.

Drawing. Although the drafting mechanism has not changed basically in any of the drawing machines, there have been many refinements in the machines themselves. All the gearing is housed in the frame ends, which are of the box type. The drafting mechanism is driven by chain and sprockets instead of by a pulley and a flat belt, thus insuring a positive drive. A chain drive is now fitted to the carrier rollers, which eliminates all carrier gearing and enables very close settings to be obtained. Safety spindle tops have been designed to lock to spindle hoop in its operating position so that it cannot fly out.

A knock-off motion has been applied to stop the machine when a predetermined length of slubbing has been delivered. Electric stop motions have been designed which stop the machine if an end breaks at the back or at the front.

In Retrospect

(Textile Industries, February '07)

EDITORIAL: The best informed and ablest correspondents shall be employed in the effort to keep our readers fully alive to what is transpiring. Contributions from the world's authorities on the manufacture of cotton will fill a considerable part of every issue.

We shall make the magazine a monthly encyclopedia of the mill business; a constant reference book for the mill man, and it is to the mill man in the various departments that we must look for criticisms and commendations.

No suggestions of our readers will be overlooked, and we shall always appreciate their advice.

Finishing, Reducing, and Roving. The introduction of the Rabbeth spindle, replacing the old long collar spindle was one of the major improvements in these machines that permitted much higher spindle speeds and increased production. Bobbin sizes have been increased; ball bearing tension pulleys and top rolls have reduced the power consumption of the machines. Chain drives for the carriers and lifter motions are now standard equipment, and a spring clutch on the lifter prevents breakages in case of a mishap.

The spindle which has a ball bearing steadier on the top of the spindle and a ball bearing at the spindle rail permits speeds approximately 50% faster than the Rabbeth spindle for flyer frames.

The ring rover with the Rabbeth spindle gives the highest speed and production of any type of reducer or rover for fine rovings, but smaller bobbin sizes are required for the same dram roving than when the flyer system is used.

A chain driven change speed device is used to eliminate the necessity of changing driving pulleys and length of driving belts, where changes in spindle speeds are frequently required.

Electrical stop motions stop the machine when an end breaks in the creel at the back of the machine. A knock-off motion stops the machine when a predetermined length of roving has been wound onto the bobbins.

Cone Drawing. Improvements in cone drawing machinery consists of: (1) Redesign of the differential motion; (2) chain and sprocket drive for the bobbin drive which abolishes the swing levers; (3) full bobbin stop motion; (4) length knocker-off; (5) roving detector motion; and (6) substituting cut gears for cast gears for the bobbin and spindle drives, and running them in a bath of oil.

These improvements have permitted quieter running, increased speed, and greater production.

Spinning. Flyer spinning was the original system, and the common collar type of frame has been superseded by the more efficient

flyer doffer spinning frames, construction of which offers considerable advantages in speed and production quite apart from the mechanical doffing operation. For certain classes of yarn the flyer system is still preferred due to the smooth yarns produced and the absence of ballooning.

The cap system of spinning, which was formerly a standard frame for spinning medium and fine counts, has now been superseded for counts below 40s by ring frames of the large package type.

The ring system of spinning is used extensively for counts from 8s to 40s on all types of yarns. The traverse of the bobbin is usually 7½" and the rings 2½" to 3" diameter. Self-lubricating rings of various types have aided greatly in improving the spin. The bobbin holds approximately 6½ ounces as compared with 2 ounces for the flyer bobbin and 3 ounces for the largest cap bobbin.

Anti-friction bearings for the tin cylinders, tension pulleys, and top rolls have reduced the horsepower consumption of the machine. Heavier lifter motions driven by chain and sprockets give a steady operation of traverse.

Simplified means of reversing the direction of rotation of the spindles for reverse twist has reduced the time of stopping the machines to make the necessary changes. Mechanical doffing motions for both the flyer and cap frames have reduced the number of operatives required for doffing and the time required for this operation.

The chain drive is also fitted to the carrier rollers as mentioned in the description of drawing frames.

The method of lubricating various parts of the machines has been centralized and made automatic. Improvement in metals has reduced the wearing of such parts as flyers, caps, tubes, whorls, spindles, rings, and travelers.

Tin cylinders are spot welded and better balanced for higher operating speeds. A change speed drive of the tin cylinder, enabling a range of spindle speeds to be obtained by a simplified means, is being used to a great extent today.

Rabbeth spindles of sturdier construction have been designed due to the demand for higher speeds and larger packages. Some are equipped with a clutch for driving the spindles, others with a milled pin, or a frictional drive, Several methods have been devised to reduce the balloon and improve the spin for long traverse bobbins.

Twisting. Rapid strides have been made in twisting, especially in connection with large packages, and the uses of this class of machinery are not confined solely to the worsted industry. Many frames for woolen and carpet yarn trades are made, incorporating the universal system with a stop motion for both spindles and rollers, and with packages consistent with today's demands for the maximum amount of yarn on each bobbin.

The accepted twister for two fold work was the dolly roll trap motion machine of the flyer type. This was later replaced by caps, which are still used for fine work, and then by rings. A locker motion to carry the empty bobbins to a box at the end of the machine has been applied.

Chain and sprockets to drive the lifter motion and top part of the frame have been added.

Ring twisters of wider gauge and bobbin traverses up to 11 inches are now available. To overcome the difficulty of ballooning with this long traverse, a special type of lifter motion is used which gives simultaneous but opposite traverses to both ring plate and spindle rail. With the invention of other types of stop motions, the horizontal roll twister is also used extensively for two fold work.

Tape and tension driving of the spindles has replaced the band drive. Knee brakes to stop the spindle when tying in an end have been applied. All these changes have made for a steadier, faster running machine, with resultant savings in manufacturing costs.

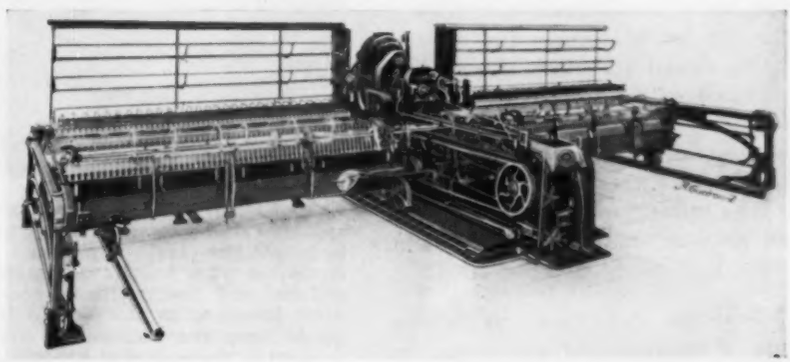
The universal twisting frame was and is the standard for more than two ply yarns.

Band drive with dead and live driving pulleys have been replaced by tape drive, tension pulleys, tin cylinders, and a twin-clutch spindle. When an end breaks either at the back or the front, the delivery of the yarn and the rotation of the spindle stops immediately.

These machines are made in gauges up to 7½ inches and traverses up to 9 inches. In the gauges up to 5 inches the magnum motion may be applied to obtain an 11-inch traverse. The Axminster twister of this type has a bobbin, 9-inch traverse, 5½-inch base, 3⅝-inch top, and holds 42 ounces of yarn.

A twister combining the features of the dolly roll and universal machines is available and is used in the mohair and alpaca trades.

Photo courtesy, Societe Alsacienne de Constructions Mecaniques.



"Mules have been greatly improved by the adoption of anti-friction spindles, steel carriages, and the Taine differential drive. These have increased the horsepower consumption and increased the production of the machine."

Fancy twisters of various types and greatly improved design are available for the widest range of fancy yarns. They are usually constructed on the universal principle.

Reeling. The old style reels have been greatly improved by the incorporation of adjustable swifts, cross reeling motions, knock-off motions, and sturdier construction. A high speed reeling machine of 10 ends has lately been developed, which is finding favor in the worsted trade.

French or Continental System

When 100% short wools are to be worked, the French or Continental method is used. This is achieved by a series of gilling operations followed by porcupine drawing boxes and either mule or ring spinning.

Gilling. The invention of the intersecting gillbox was the first notable improvement in the French system of manufacturing and was where this machine was first used in worsted yarn processing. It was later applied to the Bradford system. By its use the number of operations were reduced, with improved qualities of roving. It is different from the Bradford type in that each head is individually driven; machines with as many as six heads are used. Also, the front rolls are much smaller in diameter.

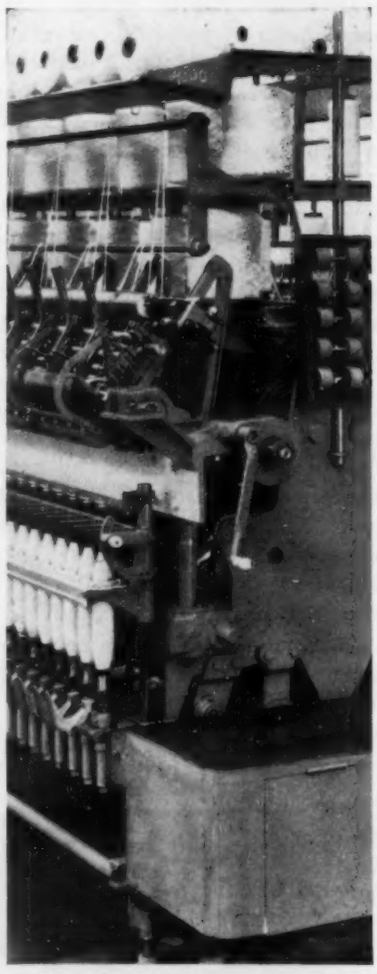
A patented faller with an oblique end reduces the intensity of precussion when the cam strikes the faller, resulting in increased faller speeds up to 25% and therefore increased production.

The application of a hinge to the top screw block, permitting the top set of screws and fallers to be raised for clearing of both sets and easy removal of the bottom set without the gears driving the faller screws becoming disengaged, is a great improvement.

The mixing intersecting gill for all wool or mixtures of cotton and wool is another notable advance.

Drawing. For many years the use of intersecting gill boxes in a drawing set was limited to the first three operations, and the subsequent passages consisted of porcupine drawing frames, in spite of their obviously imperfect drawing. With the design of an intersecting able to produce four slivers on each head, equipped with a rubbing device such as is used on the drawing frames, it has been possible to use this machine in the fourth and fifth operations of a drawing set.

This machine, known as a "bobinier-intersecting," replaces the Reunion and Bobinier de Chute with the large diameter porcupines. It produces relatively light slivers of a strength equal to that obtained on the drawing frames.



The French-type worsted ring spinning frame recently announced by McGlynn Hays Industries is equipped with 6 lines of drafting rollers, and the drafting mechanism is raised as the bobbin fills up to keep the balloon the same during the spinning process.

Drawing with a double set of fallers allows higher drafts than those obtained on drawing frames equipped with porcupine heads, and therefore furnishes the opportunity of either increasing the doubling in those sets where the final sliver is not regular, with subsequent improvement in same, or reducing the number of operations in the set.

The Gills Frotteur is an open gill box equipped with a rubbing device; it is used in the fifth operation of a set where fine rovings are to be spun and the field of pins of an intersecting is too great for the light end to be produced.

Drawing Frames. Improved rubbing mechanisms, giving less vibration and a smoother operation of the rubbing device, have been introduced.

Ball bearing top rolls and synthetic rubber covered top rolls are being used. Chain drives have replaced some of the gearing in the driving end of the frames, and the weighting of the top rolls can be all relieved simultaneously.

Spinning. Although in the past most of the spinning has been on the mules, this is now being replaced by ring frames equipped with high drafting. Mules have been greatly improved by the adoption of anti-friction spindles, steel carriages, and the Taine differential drive. These have reduced the horsepower consumption and increased the production of the machine.

A reverse twist device consisting of a gear box of helical cut gears is placed on the tin roller shaft between the headstock and the tin roller.

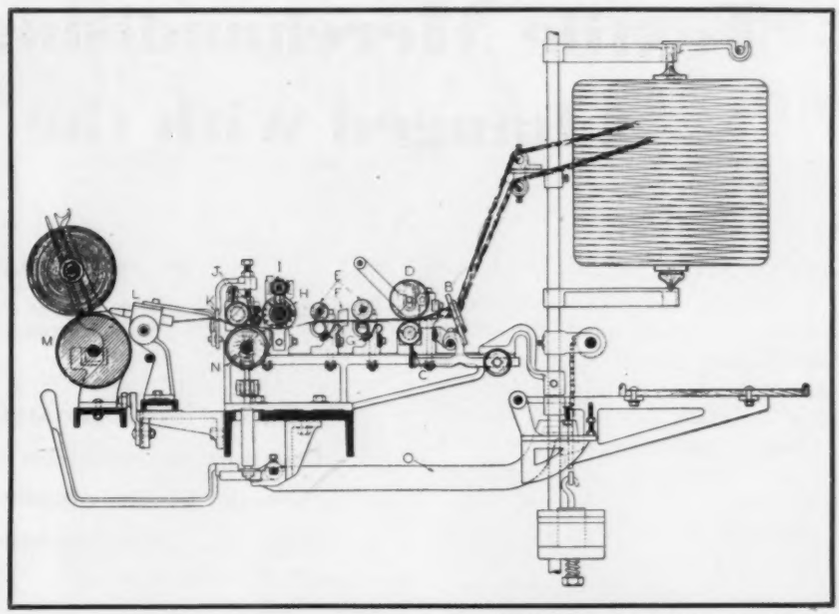
Ring spinning frames have had many changes, such as anti-friction bearings and spindles, wider gauges, longer traverse of the bobbins, improved lifter motions, chain drives replacing gear drives, one tape driving 24 spindles instead of four spindles, and variable speed spinning control by slip ring motors.

A new frame has just been introduced which has 6 lines of drafting rollers instead of the conventional 5 lines of rollers, and

the drafting mechanism is raised as the bobbin fills up to keep the balloon the same during this process.

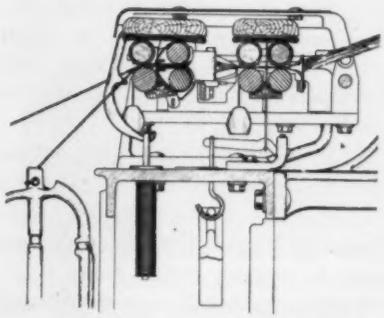
Anglo-Continental System. This system combines some of the principles of the Bradford and the French systems. It was invented with the object of enabling spinners on the English system to utilize a method which would give a product suitable for competing with the dry spun yarn trade, particularly where softness is an important feature. It is capable of processing blends of material containing a percentage of short fibers, which cannot be dealt with successfully on the open system of drawing.

Standard French intersecting gill boxes are used for the first operations. Then the Anglo-Continental drawing box is used, which is similar to French drawing box except that the porcupine is larger in diameter and has a stripping bar between the rows of needles; the end passes under the porcupine instead of over it, as in the French system, and revolving funnels are used in place of rub aprons. The finishing operations are cone finishers and rovers.



Courtesy, Prince-Smith & Stells Ltd.

Schematic diagram of the Anglo-Continental drawing box. Key: A, adjustable sliver guide bars; B, adjustable individual pot sliver feed guides; C, brush cleaner for bottom back roller; D, back rollers; E, carrier rollers; F, funnel guide; G, felt-covered rubbers for bottom carrier rollers; H, patent porcupine with stripping bars; I, circular porcupine brush; J, brush and roller cleaners for front rollers; K, adjustable sliver guide; L, revolving funnel; M, balling roller; N, cork-covered press roller for front rollers; O, weighting lever for front press roller.



Courtesy, Whitin Machine Works

Cross-sectional view of the drafting mechanism on the slubber used in the American system of manufacturing worsted yarns.

American System. This system started in some cotton mills just before the last war, utilizing machinery originally patterned for staple rayon fiber.

A standard cotton draw box was used for the first operations, but there have been many changes in the construction of this machine to date; some mills also use some type of an intersecting gill box.

High draft cotton slubbers with modifications are used for the roving operation. Cotton spinning frames equipped with one of several systems of high drafting are used to spin the yarns.

Today with modern machine tools available, production of worsted textile machinery has made rapid strides, and the machines contain many excellent features which tend to give higher production, increased efficiency, less mechanical troubles, and a reduction in the number of operations required to produce a good level yarn.

A great deal of experimental and development work is now going on by all the textile machinery manufacturers in the U.S.A. and abroad, with a view to further improving the quality of the end produced at even greater speeds and drafts than now seems possible, and with fewer operations than it has been possible to attain with standard worsted machinery of either system.

In Retrospect

(Textile Industries, November '09)

Efforts have been made for the last hundred years to produce a practical loom that carries a shuttle in a circle, weaving cloth in a tubular form. Anker Peterson of Peterson Circular Loom Co., has now produced such a weaving machine.

The method of beating the filling up, taking place without a reed, is done by rollers attached to the shuttles, which roll the filling in as they pass.

Textile Merchandising Methods Changed with the Times

By JOHN ALDEN SPOONER

Vice-President In Charge of Public Relations and Advertising
Textron Incorporated

Industry no longer strictly production minded. Vertical integration and the trend toward variety place emphasis on merchandising-advertising-distribution.

ANY HISTORICAL view of the textile industry's merchandising evolution must recognize two distinct trends. One pulls in the direction of simplicity and efficiency. The other pulls in the direction of greater complexity. Both of these trends are discernible in textiles.

The pull in the direction of simplicity can be best told by telling the story of Textron which is generally regarded as the chief exponent of vertical integration in the industry. Under this system we dispense with the 18th century practice, still in vogue and still practiced to some extent, of having dozens of separate entities contribute piecemeal to the manufacture of a finished textile garment or fabric.

We handle under one management all of the manufacturing steps from yarn to the finished consumer product.

We assume responsibility for quality control throughout all stages of manufacturing, and with this assurance of uniformity we promote and advertise our goods aggressively.

The more complex phase in textile merchandising is an outgrowth of technological advances and the growth of synthetics. In the old days, cotton was cotton and wool was wool. Now we have new fibers, fabrics, and finishes blended in infinite variety, producing end-products with wholly new and important characteristics. The proper identification for the consumer of these fabrics and their characteristics is a matter of increasing concern to the industry.

Curiously enough, both trends—the trend toward vertical integration and the trend toward greater variety of fabrics and finishes—have placed more emphasis on merchandising, advertising, and distribution in an industry that once was strictly production-minded.

Merchandising, Past and Present. A half century ago, a group of stove-pipe-hat, frock-coated merchants in New York's Worth Street provided "distribution" for the textile industry.

The wholesale dry goods firms of that day made purchases of the long-term variety—twice a year for the most part. Transportation was neither reliable nor fast. Inventories were large and moved leisurely. Department stores, general stores, and mail order houses were still in their infancy, and most of the household goods and apparel were home sewn. Fifty years ago the mills did not have the tremendous selling force of large retail establishments, of modern promotions. Even thirty years ago, accounts with retail establishments were scarce.

The converting trade stepped in to quicken the tempo and movement of goods. Around the time of the first World War it was the converters who took grey goods and gave them brighter design, color, and finish. This advanced a little the evolution of the production and marketing system. But, most mills were content to go on making grey goods and had little conception of the opportunities in integration.

Back in those days, mills relied entirely on commission merchants to keep an eye on market conditions, to select customers, and even to assume credit risks.

Following the end of World War I, bad days fell upon the industry. Their post war recovery was short-lived. Depression set in fully four to five years before the great crash of 1929 engulfed everyone. Through the thirties, failure piled upon failure. Once-great mills closed their doors, never to open again. Cotton spindleage dropped from 35 million in 1925 to 24 million in 1939.

Out of this terrible erosion, however, there emerged a group of companies that had demonstrated their adaptability, their right to survive. They demonstrated this

Du Pont Color Conditioning helps employees

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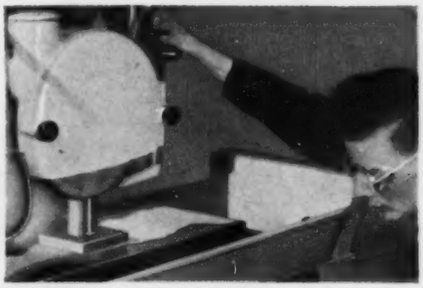
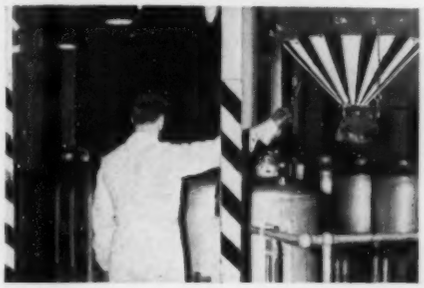
- FEEL BETTER
- WORK BETTER



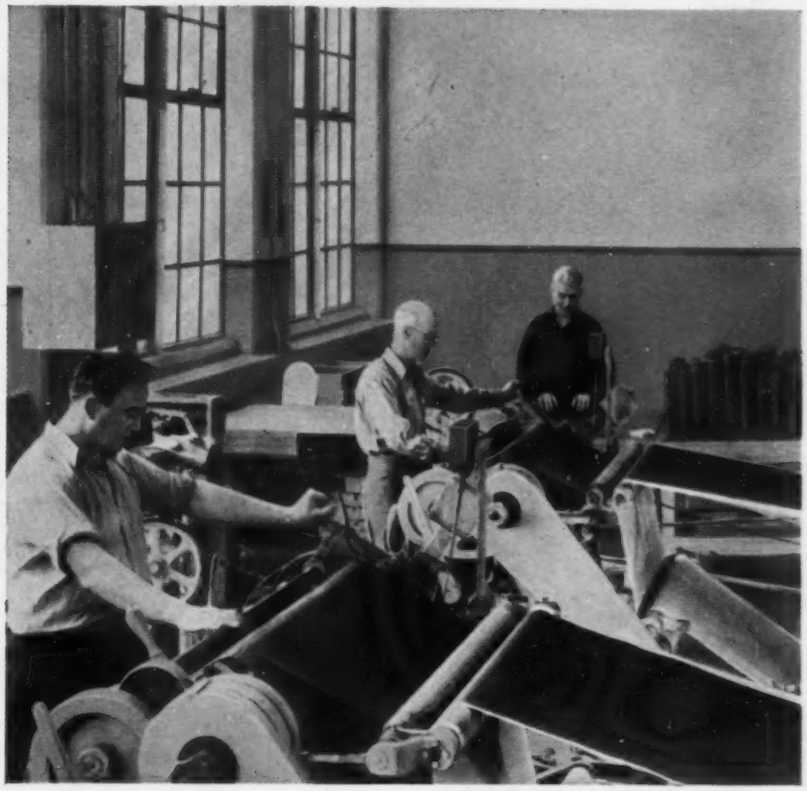
VISIBILITY. You will find comfortable seeing wherever Color Conditioning is used. By reducing glare, providing the correct degree of "brightness" within the worker's field of vision, eyestrain is eliminated, fatigue minimized.



SAFETY. The Du Pont Safety Color Code helps prevent costly accidents. Colors and symbols point out fire-protection and first-aid equipment, warn workers against accident hazards.

MORALE. Color can make employees more content in their environment. Color Conditioning in restrooms, washrooms, cafeterias, etc., makes your plant more cheerful, betters employee-management relations.

FOR EVERY INTERIOR. Color Conditioning can be applied to every part of your plant. Offices, corridors, stairways, all interiors can be painted to provide an overall atmosphere that is pleasant and efficient.



Boston Woven Hose and Rubber Co., Cambridge, Mass.

THE ADVANTAGES of Du Pont Color Conditioning have been confirmed in hundreds of industrial plants. This scientific plan contributes to the worker's efficiency, health, comfort, and morale. It improves the rate and quality of production, cuts maintenance costs. Color Conditioning helps workers see better, feel better, work better. Find out how this proved plan can help you in your plant. Send coupon below to E. I. du Pont de Nemours & Co. (Inc.), Finishes Div., Wilmington 98, Del.

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Made from selected raw cotton, this superior mercerized combed cotton yarn is all carefully processed under rigid controls in our own plants developed by our over seventy years' manufacturing experience and our modern research. This manufacturing care keeps breaks, work stoppages at minimum and consumer acceptance at peak. Leading knitters rely on STANDARD Durene to maintain their quality production and sales. You will find it pays, too. Ask our representative to make recommendations.
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Photo by Bachrach.

John Alden Spooner.

in various ways. Some merchandised and promoted their products more aggressively. Some decided that rather than let synthetics break them, they would adopt synthetics.

Textron's Chain Reaction. One of the companies that had struggled through all of the vicissitudes of the times was a synthetic yarn processing company. This company had started with $10,000 of borrowed capital in the mid-twenties. By 1941 it was employing 800 persons and doing an annual business of $7,000,000. But the bombs that fell on Pearl Harbor that December touched off a chain reaction that converted the company into a manufacturer of parachutes and other war materials. Ultimately the company changed its name from Atlantic Rayon Corp. to "Textron," and it embarked on a post-war career that became an important part of the pattern for a revolution in the whole textile industry—in its organizational structure and in its marketing and merchandising habits.

By 1943, with the drive for original equipment over, government replacement orders began to taper off. No one knew whether they would pick up again, or when.

The Integration. It was at this stage, when firing of help, plant shutdowns, and lingering uncertainty might have spelled doom for the company, that a bolder conception began to take shape—a decision to initiate a wholly new future for the company. Instead of firing we hired. Instead of selling plants we bought new ones to round out the "Yarn to You" concept of integration.

Out of these decisions and these activities the present Textron with its 14 mill groups and 14,000 employees, with its $125,000,000 annual sales, was created.

Soon other lines were introduced. Today we have our Textron-labeled apparel line which is composed of five divisions consisting of:

(1) Negligees . . . bedjackets, women's pajamas, brief coats and hostess coats.

(2) Woven lingerie . . . slips, nightgowns, matching bedjackets and women's pajamas.

(3) Women's blouses . . . both plain and printed, of cotton and rayon.

(4) Men's wear . . . consisting of pajamas, and shorts of cotton or rayon, and sports shirts.

(5) Our nylon-tricot lingerie operation in which we have developed a warp-knitted fabric that will neither shrink, sag, bag, cling, or run. This fabric eliminates for women the drudgery of ironing and some of us think it will revolutionize the women's lingerie business.

Organization. Each of these divisions is operated with a high degree of independence and flexibility. Each has its own manager, its own designing staff, its own advertising program.

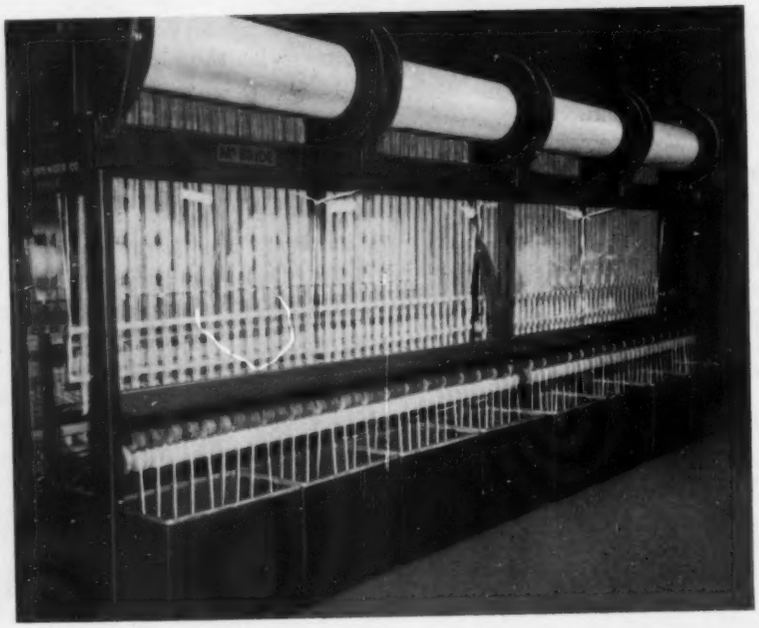
This Textron-labeled apparel operation has a general sales manager and two assistants supervising the work of approximately 60 salesmen, in the distribution of the products of the five divisions.

So much for apparel. Then there is the Nashua Mills, Division of Textron, which manufactures and sells home furnishings and domestics under the well-established Nashua brand name. This division also has its own general sales manager and a staff of 37 salesmen. It makes the famous Nashua Purrey rayon blankets, as well as other blankets of cotton and mixed fibers. It also makes combed percale sheets, heavy-duty muslin sheets, the world-famous Indian Head Cotton with the oldest trade name in textiles.

The Key: Merchandising. Now what does all this add up to in terms of human values? Surely we are building something more than mere size. We are building a well-rounded operation and merchandising it vigorously. We are applying the same promotional efforts to the Nashua Division, with its old-line trade names, as we did when we created the Textron brand-name. In Nashua we have established brands to work with. In the case of Textron, which has become in four years second only to nylon in consumer recognition, we had to start from scratch, but the carry through is identical for

Textron-Tricot, the newest of Textron's agressive merchandise operations, has been set up to turn out a specialized type of knitted women's wear.

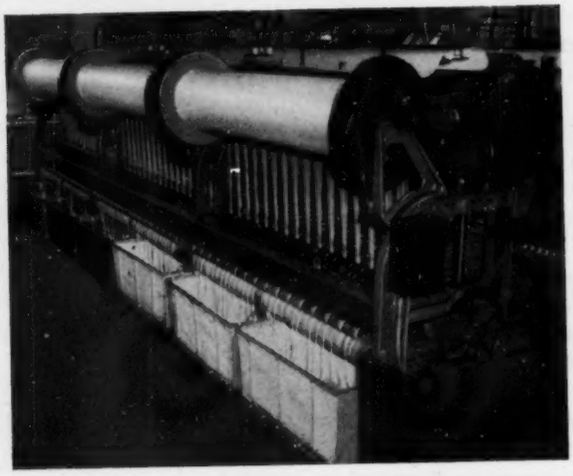
COMPLETE NARROW FABRIC LOOM BEAM INSTALLATIONS



Left
Installation on Insinger Loom

Below
Installation on Fletcher Loom

We design and make Loom Beam installations for any type Narrow Fabric Loom.



Illustrated are typical McBRIDE Loom Beam installations on Narrow Fabric Looms. We supply warp beam brackets and brake bands to fit your requirements; furnish either aluminum or steel warp beams with threaded barrels for adjusting flanges. Friction drums are attached to the flanges or can be separate, whichever you prefer. Journals are an integral part of the beam and not the flange, giving stronger construction and making the flanges interchangeable without disturbing the journals.

Phone us or write your requirements. We will send our engineers to your plant where they will make "on the job" layouts of your contemplated installation, cooperating with your Overseer, and assuring you of a satisfactory installation.

EDWARD J. McBRIDE

MANUFACTURER FOR THE TEXTILE INDUSTRY

Phone: Jefferson 5-8622

Adams Avenue and Leiper Street

Philadelphia, Pennsylvania

both—good products — well designed, widely distributed, aggressively promoted.

One of the things we think we are building is better security for employees and investors—for both the employees and the investors in the textile industry have a stake in the promotional, advertising, and merchandising efforts of the industry.

The story behind the selection of the Textron brand name and its method of promotion shows how a profitable tie-up can be made between a brand and its method of merchandising.

Advertising. From the start Textron's advertising was assigned the dual role of selling not only merchandise but a new name in the textile field. All advertising in national magazines was designed, at first, to bypass emphasis on individual merchandise in order to create a more forceful impression of the company's personality. For this purpose, a highly imaginative modern style of art was used. This was done for two reasons, first to sell the products, the other to sell the company.

The selection of the simple gothic brand name which appears on all Textron advertising and products would seem to be an easy task in itself, because of its simplicity, but this was not the case.

The products to be manufactured, based on available facilities, machinery, and type of trained employees, fell into the classification of sewn textiles. Therefore, a study of the market, the volume, and the profit potentials was undertaken. The competitive situation in terms of companies engaged in each category together with their sales and advertising techniques, the wartime demands and shortages of certain merchandise for every type of sewn textile consumer product which the company could make, were also studied. Out of this came the long list of products previously enumerated.

Evolution of Brand-Name. Meanwhile, J. Walter Thompson, our advertising agency, had been studying brand names. Since some mention of miracle fabrics was to be incorporated in the copy story, it was obvious that a product name was needed which would reflect the forward-looking attitude of the company. Out of this thinking Textron (Tex-Tron) was born. This was one of the many names submitted. It combined the old and the new in Textiles. The (Tex) for textiles and the (Tron) for the various synthetics mostly ending in (on).

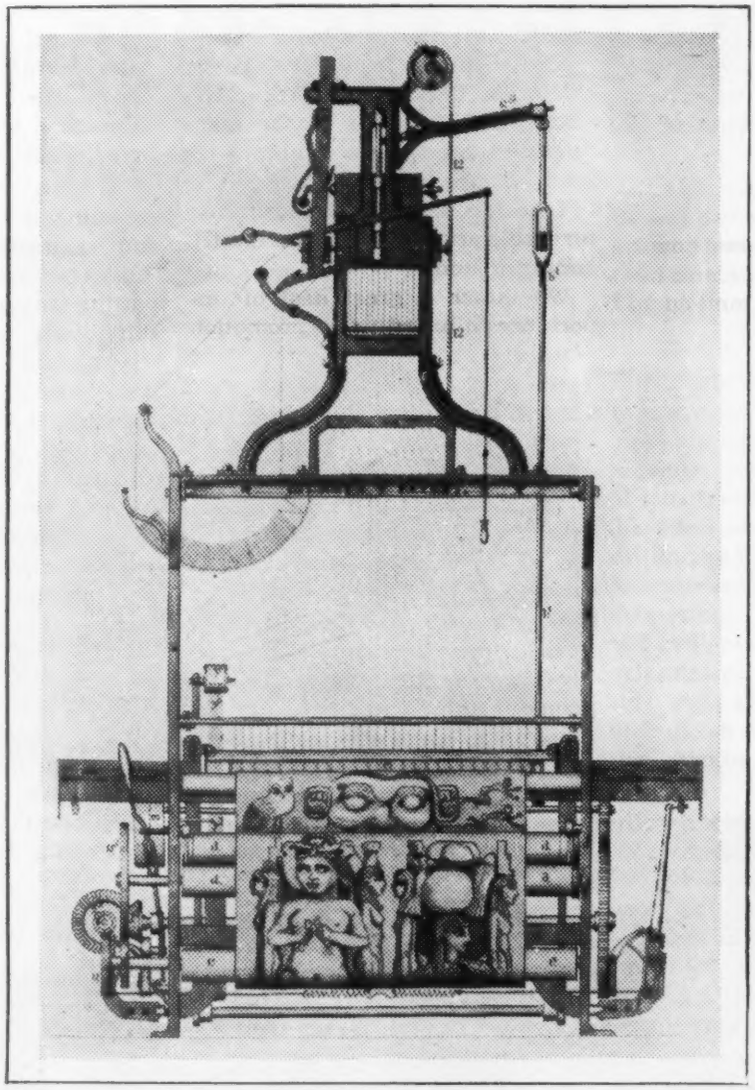
We attach a great deal of importance to brand-name promotion because experience shows that greater stability in employment and in profits accrue to those companies sponsoring brand-name products.

Brand-name promotion opens the door to new sales and brings in repeat business for the retailer and therefore for the manufacturer—provided, however, that the brand name is continually placed before the attention of the consumer. Brand-name products also guarantee quality maintenance and the respect of the consumer, because when you advertise you must deliver good quality merchandise. Any other policy would destroy the value of the brand name. Therefore, the brand-name is the symbol of the manufacturer-er's integrity and his responsibility to the public. It has contributed to raising the standard of living, and through it we hope to go on raising the standard of living.

I have spelled out the true meaning of advertising, promotion, and aggressive merchandising to illustrate how far we have gone in putting strong emphasis on selling. Fifty years ago the textile industry neglected this phase. Twenty years ago the advertising expenditures for the entire textile industry amounted only to $3,000,000 annually. Now they are up to $50,000,000 annually, but we are still behind the other manufacturers of consumer goods, such as food, soap and others.

Look into the Future. The trend in textiles is clearly marked: larger units within the industry, partial integration (if not always on the complete scale as practiced by Textron), and a stronger effort to support the selling and merchandising function.

Textron Has New Material
TEXTRON PRODUCING WOMEN'S SLIPS OF NON-WRINKLE CLOTH
Textron Develops New Quick-Drying Lingerie Fabric
Fabric Tested
Good News for All Women
New Textron Nylon for Lingerie Eliminates Need for Ironing
New Type Of Lingerie Introduced
Textron Introduces New Nylon Fabric
New Nylon Tricot Made by Textron for Intimate Wear
Textron Company Has New Fabric
TEXTRON DELIVERING TRICOT KNIT NYLON
New Nylon Fabric Needs No Ironing
Develops New Textron Fabric For Lingerie



A HUNDRED YEARS AGO...

this was the latest thing in looms, but just as industry has modernized its mechanical equipment, it has also streamlined its financial and credit methods. Today, the efficient manufacturer leaves his financial and credit problems to a specialist... the factor. We, as factors, have not only provided cash, service and credit protection to manufacturers in good times and bad, but time and again we have combined our capital with the ingenuity and foresight of our clients to improve their ability to stay in business . . . to profit and compete.

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Meinhard, Greeff & Co., Inc.

51 Madison Avenue, New York City

SOUTHERN OFFICE

E. F. Skinner, Johnston Building, Charlotte, N. C., Charlotte 2-5449

Plastics and Textiles

By D. S. PLUMB
Plastics Division
Monsanto Chemical Company

Textiles has met a newcomer, plastics; is its customer, its ally, and its competitor. Greater markets may be in store for both.

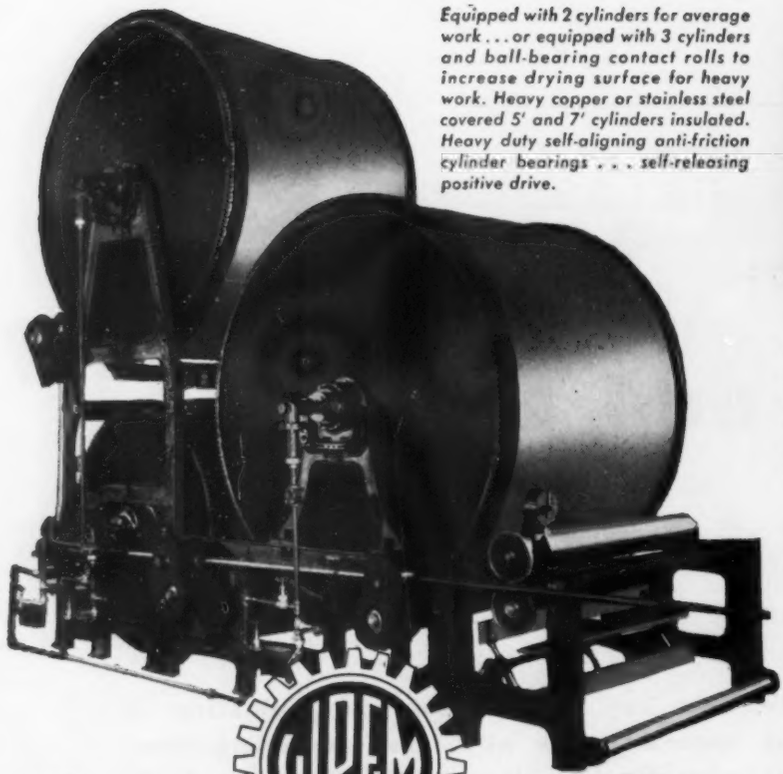
WITH EACH succeeding year of rapid development of the scope and size of the synthetic resin industry, two facts become increasingly evident. Plastics are important to the textile industry, and textiles are important to the plastics industry.

Size of Industry. Fifty years ago when the textile industry had been producing for thousands of years, there existed no synthetic resin industry whatever, and with the exception of the manufacture of a few nitrocellulose products, there was no plastic industry using synthetic raw materials. Even twenty-five years ago synthetic resins were still in their infancy, only about six million pounds being produced. By the start of the war, this figure had jumped to 277 million pounds, and by 1947 it was barely under a billion pounds, a tonnage equal to the entire prewar rubber industry.

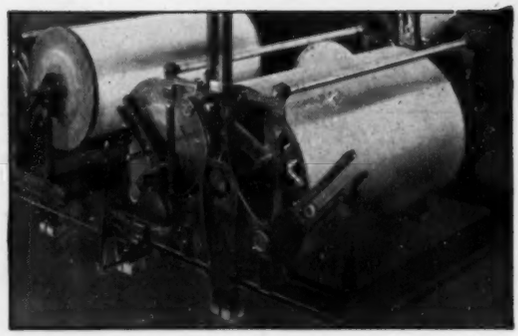
The "jam-proof" table cloth shown here looks and feels very much like an uncoated fabric; a damp cloth is all that is needed to clean up the jam. The table cloth is made from a cotton fabric on which a super-thin layer of transparent plastic, vinyl butyral, has been applied.

Customer — Ally — Competitor. There is a complicated interlocking relationship between this fast growing industry and textiles. First, textiles are a good customer for the plastics industry using resins for the finishing of fabrics and for the manufacture of monofilaments used in the weaving of fabrics. Second, plastics serve as an aid in building a market for textiles by their use in the manufacture of coated fabrics. Third, plastics are a challenge to textiles by the development of plastic film products for use in applications formerly served entirely by fabrics.

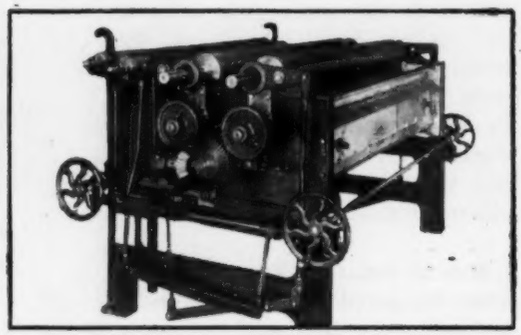
Exact statistics for these various fields are difficult to obtain. The Bureau of Census and the Tariff Commission do report production of resins for these various



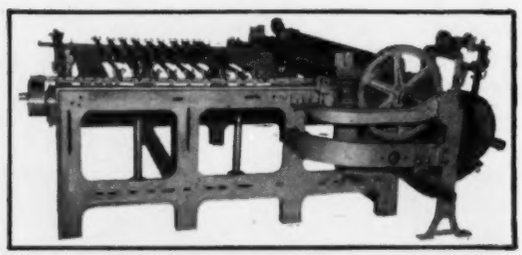
Equipped with 2 cylinders for average work . . . or equipped with 3 cylinders and ball-bearing contact rolls to increase drying surface for heavy work. Heavy copper or stainless steel covered 5' and 7' cylinders insulated. Heavy duty self-aligning anti-friction cylinder bearings . . . self-releasing positive drive.



WHITE CREEL (above) — positively driven — controls yarn stretch; makes sizing faster, more uniform; smooths starts and stops; eliminates breakage and waste. Also available: standard over-under type creel with continuous side rails or extra-height, close-coupled creel for limited space. All creels ball-bearing equipped.



Stainless steel SIZE BOX with extra deep bronze stuffing boxes. Size rolls mounted on ball-bearing journals. Special squeeze-roll lift eliminates strain . . . keeps squeeze rolls accurately positioned over size rolls.



HEAD END, built for single or double beams up to 26", is ball-bearing throughout, either friction or motor driven with variable speed transmission, variable speed single drive, or multi-motor drive. Independent beam wind-up for beams over 26" in diameter.

The new COTTON SLASHER

Sure cure for size troubles!

Here's a new, improved, mill-tested Slasher . . . combining many special features and equipment . . . that's designed to correctly size the lightest gauze or the heaviest sheeting at top speed and lowest cost.

Whatever your specific mill requirements and problems, the WPF&M Slasher can be adapted to fit your needs and cure your sizing troubles.

Check the many outstanding features found only in the WPF&M Slasher. Let us show you how modern slashing equipment and methods can increase production, improve quality and reduce cost.

FREE BOOKLET

"Cotton Slashers"

Describes the many special features found only in the WPF&M Slasher.

MAY WE SEND YOU A COPY?

Manufactured by

WEST POINT FOUNDRY & MACHINE CO.

WEST POINT, GEORGIA

uses, but usually group them with paper and leather treatments or other applications. Making rough estimates, about 40 million pounds of urea and melamine resins were used in textile finishing in 1947. About 25 million pounds of plastics based on synthetic resins were used for textile coating in 1947, exclusive of oilcloth and linoleum. About 60 million pounds of plastics made from synthetic resins were used in unsupported films in 1947, of which probably 125 million yards were marketed directly through textile channels for textile types of end uses. The remaining poundage in heavier gauges of film, although competing more directly with leather, undoubtedly also affected the market for coated textiles.

When considering filaments, nylon and cellulose acetate rayon are really plastic materials, but their consumption is so large that they are considered to be industries in themselves and are not included in these statistics. Vinyl chloride and vinylidene chloride monofilaments account for a moderate poundage of textiles produced.

All told, excluding rayon and nylon, these textile uses accounted for more than 10 per cent of the synthetic resin production in 1947. Add to this about 65 million pounds of nitrocellulose (which is not considered a synthetic resin) used in the coating of fabric, and the significant interlocking of textiles and plastics becomes obvious.

Customer. The first point of contact and the least complex between plastics and textiles is in the use of resins, primarily urea formaldehyde or melamine formaldehyde, as finishing agents in imparting shrink resistance, crease resistance, and similar properties to existing textiles. In this way, plastics are presenting opportunities for impovements and modifications in existing textile products.

Ally. At the second point of contact, the coating industry presents a steady and continuing market for textiles. This is an ancient industry which received its first real impetus about one hundred years ago with the development of vulcanized rubber. Rubber, oils, and nitro-cellulose gradually became the standard coating materials until the development of vinyl type plastics in the last ten years.

Coated with vinyl butyral compounds, this upholstery is stain-proof and liquid-proof and can easily be cleaned with a damp cloth. The fabric is an alternate gray, white and yellow striped mohair created and coated by Goodall-Sanford. The coating imparts high abrasion resistance to the fabric, so that it will be less likely to be damaged by the dog's claws.

Rubber is used in widely divergent products ranging from industrial fabrics to raincoats and hospital sheeting. Oils and alkyd resins are familiar in oilcloth. Nitrocellulose is familiar in artificial leather.

Approximately 250 million yards of fabric are coated a year, and it has been estimated that nitrocellulose coatings alone account for 75,000 bales of cotton a year. Plastics entered the picture when vinyl chloride and vinyl chloride copolymer resins opened up increasing markets in this field by overcoming many of the defects present in the older coatings such as color limitations, aging problems, and fire hazards. Plastic coated fabrics have received wide acceptance in upholstery, luggage, rainwear and many other similar applications.

New coating techniques have been developed based on the use of high solids content dispersions of resins in plasticizers and diluents which have reduced costs and improved quality. Altnough to a considerable extent these newer products are simply replacing older ones, the technological improvements have increased the potential overall market for fabrics in the coating industry.

A second vinyl type of resin, vinyl butyral, has approached the coating industry from a new angle —the application of a functional coating which is transparent, practically invisible, and which changes the hand of the fabric to the minimum possible extent. The coated product thus becomes a stain-resistant, waterproof fabric closely resembling the original uncoated textile. Such a coating has found wide acceptance in printed cotton tablecloths which are pratically indistinguishable from regular cotton cloth but which are easily wiped clean from food stains.

A Feature to Remember!

ORATOL L-48 Gives Brighter Cleaner Shades

ORATOL L-48

The problem in the print wash operation is to remove excess pigment and paste constituents, *quickly* . . . to brighten and liven colors . . . with no waste of time or added expense.

Oratol L-48 has high foaming, emulsifying, and wetting properties . . . requisites in the rinsing process. Its powerful detergency and rapid scouring action greatly reduces any tendency toward bleeding. Oratol L-48 is stable in hard water and performs equally well on all types of fibres — under acid or alkaline conditions.

What this means to you:

1. Quick, effective rinsing
2. Brighter, livelier shades
3. Fewer rejects
4. Greater output . . . greater profit

Oratol L-48 has other important advantages; only a very small quantity is required when used alone as a print wash. If used in conjunction with soap, it increases the stability of the soap and prevents formation of soap curds. Oratol requires less water, rinses rapidly, and leaves the fabric with improved hand.

Ask our representative for full details about economical Oratol L-48. Or write today for technical data and your generous free sample for testing.

Plants, Branches and Warehouses

Plants: Passaic, Carlstadt, N. J.; Los Angeles, Calif.

Warehouses: Providence, R. I.; Philadelphia, Pa.; Utica, N. Y.; Chicago, Ill.; Greenville, S. C.; Chattanooga, Knoxville, Tenn.

WOLF BRAND PRODUCTS

JACQUES WOLF & CO. *Chemicals* PASSAIC, N. J.

The same principle has been extended to the coating of upholstery, slip cover, and drapery fabrics with the result that it is possible to use printed cotton fabrics and even fabrics with a small amount of texture and yet obtain the stain-resistant, waterproof functions of the conventional artificial leather type of coating. There are many possibilities for such a product in porch furniture, sun rooms, bars, nurseries, dining rooms, and elsewhere throughout the home.

This type of coating is of particular interest to textile men because the presence of style in the fabric confuses the standard marketing methods for coatings and forces the product back into the textile market channels. Transparent coatings with vinyl butyral present an interesting challenge to the textile industry and introduce coating as an integral part of textile products formerly thought of only in terms of pure fabric applications.

Competitor. Probably the greatest plastic problem facing the textile industry is the unsupported plastic film. Plastic films are based primarily on vinyl chloride or vinyl chloride copolymer resins. More recently a smaller amount of polyethylene has also entered this field. Film has been manufactured in all gauges ranging from 2 thousandths to 40 thousandths of an inch. The two largest classifications are 4 thousandths and about 20 thousandths.

The 4 thousandths product found its original acceptance in shower curtains but has greatly outgrown this field and has entered a widely assorted number of applications including rainwear, garment bags, kitchen and bathroom curtains, tablecloths, aprons, and even yard goods for home sewing. About 125 million yards of the thin product were produced and used in 1947.

It is readily admitted that many obvious mistakes were made in the early days of unsupported film. Despite these frequent misapplications, the quantity produced and used has increased steadily. These original mistakes which are widely recognized througout the industry were caused both by the fact that two films can look and feel very similar and yet perform entirely differently from a quality point of view, and by a shortage of necessary raw materials coupled with excessive demand for the product.

The refining process of competition has gradually eliminated the poorer qualities of vinyl films and greatly widened the potentialities of this material. The heavier gauge products have found wide acceptance in handbags, upholstery, and to a certain extent, luggage. It is difficult to assess how much of this yardage would have been fabric and how much would have been leather, but it is probably safe to say, combining the 4 thousandths and 20 thousandths films, that close to 150 million yards of products in 1947 which might otherwise have been textiles were made from film.

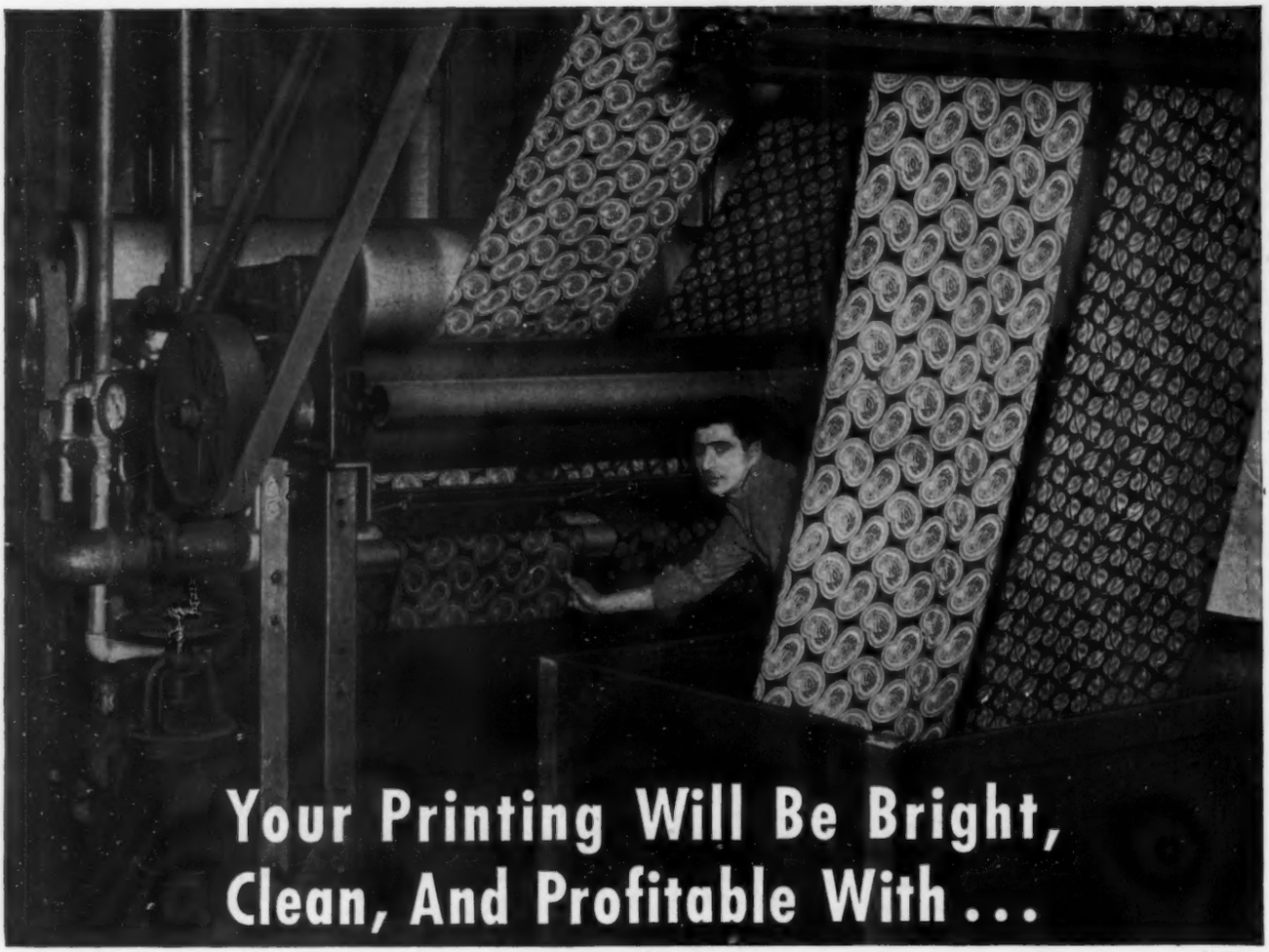
Plastics enter a new field. Lighter weight, greater comfort, easier cleaning and comparable wear are suggested by early experimental models of work gloves in which portions most affected by wear and soiling are coated with vinyl butyral. The glove shown was produced experimentally by the Riegel Textile Corporation at its Trion Division, Trion, Ga.

May Enlarge Textile's Market. It would appear that film is a product directly competing with textiles as contrasted to the other points of contact between the two industries in which resins offer opportunities to textiles, but this should not be true over the long run, as it has been rare that a new product ever failed to enlarge the overall scope of the market. For example, only a very few years ago waterproof products were seldom if ever thought of in the general household fabrics field. The entrance of film into such applications as curtains has graphically demonstrated the importance to the consumer of the functional properties of stain resistance and waterproofness.

It is entirely possible that although film may take a large share of this market, the use of plastics in conjunction with textiles can expand a portion of the same market. Combining the two, it is almost certain that the overall size of the market itself will be expanded, with the net result that textiles will not lose ground in this particular field.

Similar analogies can be made in other applications such as tablecloths, where the entrance of a low cost but attractive product may cause the use of tablecloths where none were used. This phenomenon will actually increase the overall tablecloth market and might even in the long run enlarge the consumption of textiles for this purpose.

Plastics and Textiles Inseparable. These three points of contact demonstrate the inseparable nature of the two products—plastics and textiles. Textiles are important to plastics as a direct market, as the basis for an industry using both products, and as the pattern for that powerful infant, the film industry. All the plastic products concerned with textiles are still on an upward growth curve. Plastics are important to textiles as the supplies of materials providing vast new improvements in conventional fabrics and as a new and aggressive industry offering a promise of greater markets for both products in years to come.



A Feature to Remember!

ORATOL L-48 Gives Brighter Cleaner Shades

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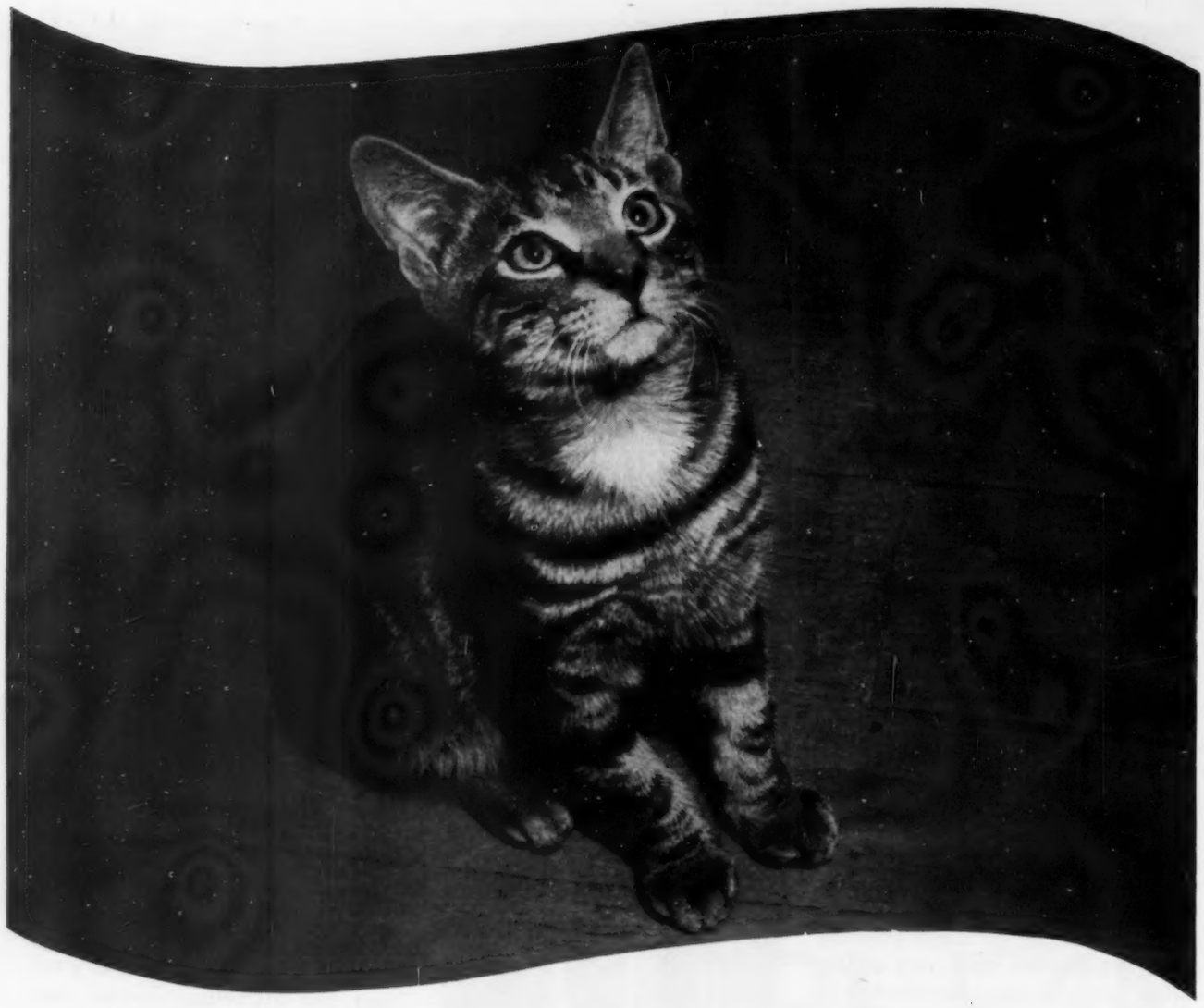


Whichever way the cat jumps . . .

It's sound business to be prepared for market demands—"whichever way the cat jumps."

In view of knitting machine manufacturers' tremendous backlogs of orders, delivery against new orders cannot be nearby.

Nevertheless, NOW is the time to lay your plans for more efficient and economical hosiery production when machines are available.

SCOTT & WILLIAMS, INC.

Established 1865

MAIN OFFICE AND PLANTS: LACONIA, NEW HAMPSHIRE

Sales Office: Empire State Building, New York 1, N. Y. • *Divisional Offices:* High Point, North Carolina • Reading, Pennsylvania • Chattanooga, Tennessee

50 Years of Progress in

Full - Fashioned Equipment

By F. K. FOGLEMAN, M. E.
Technical Writer, Textile Machine Works

Full-fashioned machine industry started in this country in 1898; 16-section, 33-gauge. Developments listed for the past 50 years.

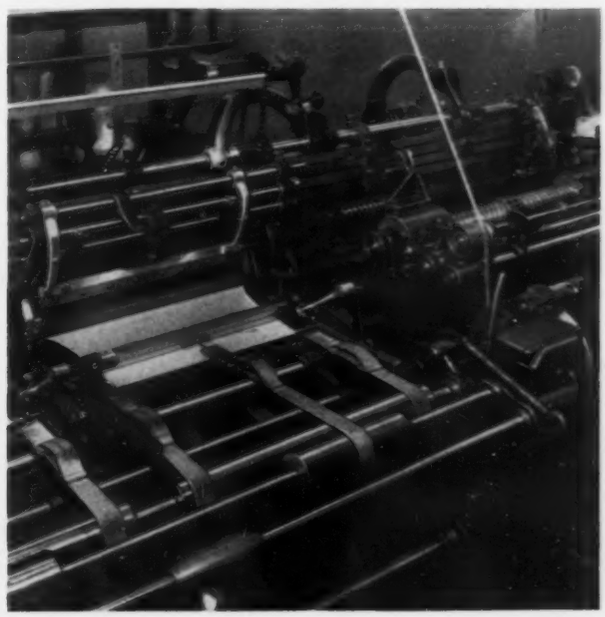
EX-PRESIDENT Coolidge once said: "Progress depends very largely on the encouragement of variety. Whatever tends to standardize the community, to establish fixed and rigid modes of thought, tends to fossilize society."

This statement by a famous American explains in a few well chosen words why we have progressed so far, not only in industry in general, but in the full-fashioned machine and allied industries as well.

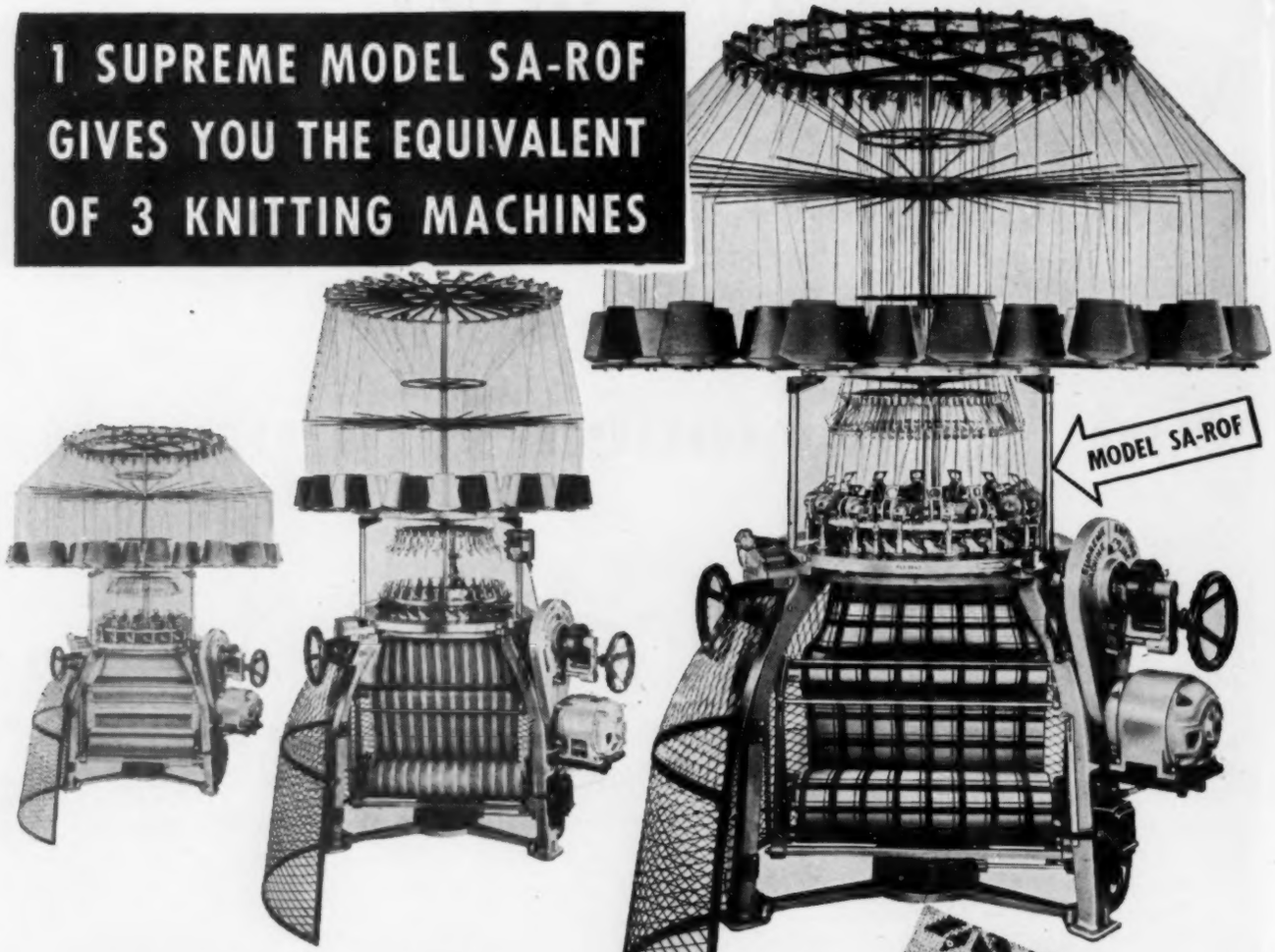
The past few years have seen the full-fashioned knitting machine become more and more complicated; from just a few years ago when a person could literally crawl through the machine at almost any section—to the present time when the cam shaft is loaded with cams and there is barely room left for another individual cam.

Contrast, if you will, the visual changes in the *Reading* full-fashioned knitting machine over the past fifty-year period. The first machine produced by Textile Machine Works, just fifty years ago,

Left, turning the welt by hand. Right, automatic welt turner as used on the latest Reading machines.



1 SUPREME MODEL SA-ROF GIVES YOU THE EQUIVALENT OF 3 KNITTING MACHINES



Supreme's New Model SA-ROF gives you the combined advantages and the varied knitting ability of three knitting machines:

1. **A variable jersey striper**
2. **A "floatless" pattern wheel machine**
3. **A plaid and check knitter**

Depending upon your production plan or market demand, with the Model SA-ROF you can knit variable striped jersey with the stripes as deep as you want varied the way you want or — widely spaced patterns and designs with the floats neatly tied to the back of the cloth or—colorful plaids and checks.

The Model SA-ROF has these exclusive design features:

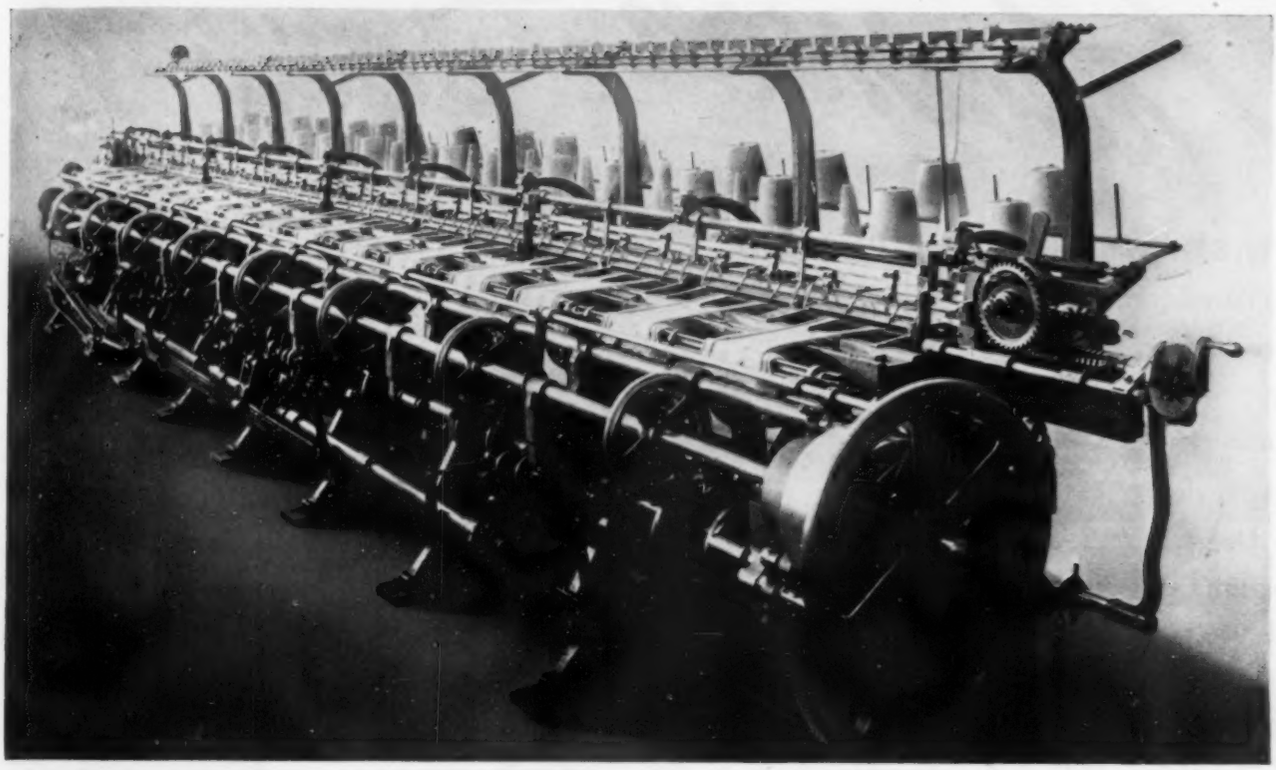
- Unique, stationary drum striping feeds and stationary yarn stand.
- Revolving cylinder and take-up.
- 24" diameter, 32 feeds. A minimum of 16 feeds knitting four colors.
- Choice of stripes, patterns or plaids.
- Quiet, concealed camming.

If you want to know more about the unusual fabrics and wider production range possible with SA-ROF, write for your copy of our new booklet, "Variable Stripes and Plaids Pay."

Mills Throughout the World Knit With Supremes

SUPREME
KNITTING MACHINE CO., INC.
105 JOHNSON AVE., BROOKLYN 6, NEW YORK, N. Y.

SK-113



The first Reading full-fashioned knitting machine, bu ilt in 1898. It was a 16- section, 33 gauge legger, belt driven. Compare this with the present day machine shown below.

was a 16-section, 33-gauge legger driven by a belt at a speed of 40 courses per minute; the present machine is a 30-section, 51-gauge unit having both legger and footer narrowing machine and driven at a speed of from 12 to 82 courses per minute by an electronic drive especially designed for the purpose.

It is entirely probable that the average person has wondered what has brought about the vast changes in the design of the full-fashioned machine during the latter part of this fifty-year period. The many changes have been brought about by the constant cry of style, for something different, and from the sales departments clamoring for a new sales point to add to their already lengthy list, in an effort to outpoint the other fellow, and thus increase sales to a point where production must be increased.

Naturally, to increase production with its attendant desired increased revenue means the use of modern, high-speed machines cared for by a minimum of efficient operators.

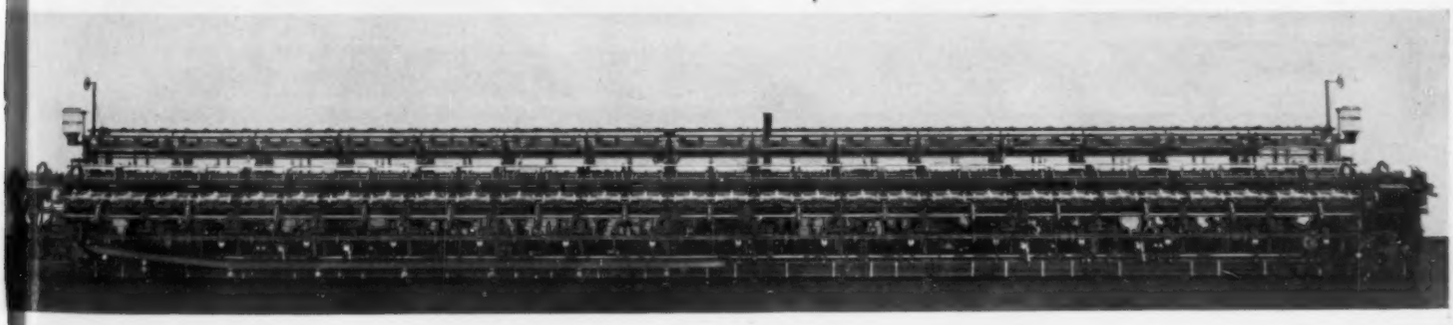
Just as in the automobile in-

In Retrospect

(Textile Industries, January '07)

In a recent communication, C. B. Carter, secretary and treasurer of the National Association of Hosiery Manufacturers, reports a continued increase in the membership, which now numbers 144.

The Reading 30-section, duo-narrowing full-fashioned knitting machine equipped with automatic welt turner. This machine, built in April 1946, was the 13,553rd to be built by this concern.



Precision Sewing

"W. & G." Machines can be relied upon to consistently maintain a high rate of production. Precision-built, the stitching which they make is stronger, smoother, smarter looking and dependable.

Users of "W. & G." Machines enjoy definite advantages in the fine quality of work produced—the high rate of production per machine, and virtual freedom from maintenance troubles.

There is a "W. & G." Machine best suited for *your* requirements.

Send for your copy of the "W. & G." Machine Catalogue, Form 769.

All the seaming, hemming and elastic belt attaching operations on this snug-fitting garment, by Laskin Bros., are done with the "Superlock" and Style 970-CWS machines.

STYLE 970-CWS

For flat elastic belt attaching —a predetermined amount of elastic is delivered to each garment coincidently with the stitching operation — without handling by the operator. Perfect size to each garment is assured.

THE "SUPERLOCK" TYPE 803

For overseaming, hemming, overedging or serging operations on a wide variety of fabrics. It is faster than the fastest overseaming machine yet devised.

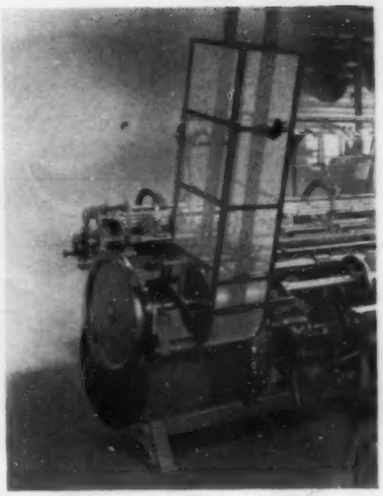
WILLCOX & GIBBS SEWING MACHINE CO.

214 WEST 39TH ST., NEW YORK 18, N. Y.

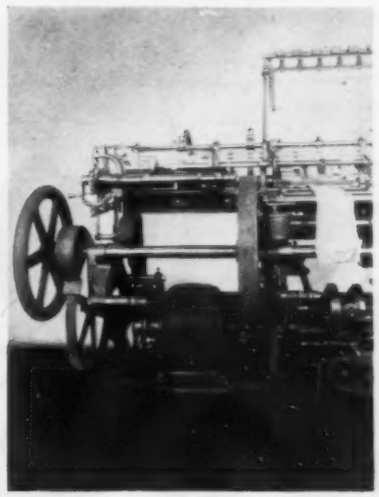
dustry, hydromatic transmission, top-toe control, fluid drive, and many other similar items have been dominant sales factors over the past few years, automatic welt turner, duo-narrowing machine, duo-flex heel construction through the use of stationary covering knives, and many other improvements have been dominant sales factors in the full-fashioned machine industry.

What a far cry from the so-called "good old days" when women wore those coarse gauge stockings with their heavy half and three-quarter silk legs, cotton tops that came below the knee and cotton feet, to the modern demand for gossamer sheer 15 and 20 denier nylon stockings knit on high-speed fine-gauge machines.

From the locked and guarded doors of industry's vast experimental workshops have come many of science's contributions to the comfort and welfare of mankind.



Machines built during the period 1898 to 1909 were equipped with belt drives. Note belt guard on this machine.



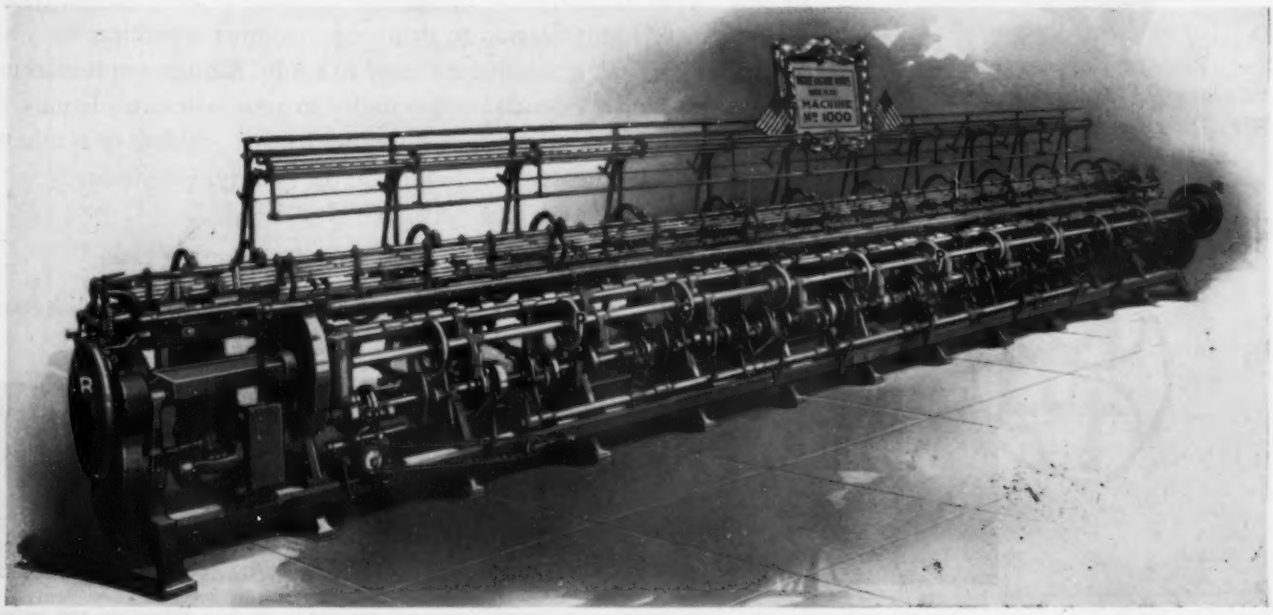
In 1909 machines were equipped with individual motor drives. Today, they are equipped with electronic drive, especially designed.

A Look at the Future

With open minds, and looking toward the future, manufacturers of full-fashioned knitting machines have in like manner brought their machines to their present stage of perfection. Engineers and workmen alike have pooled the resources of their brains and brawn to produce many of the outstanding improvements and developments in the field of full-fashioned knitting today, including the automatic welt turner; alternating three-carrier attachment for producing ringless stockings; double spindle reinforced selvage attachment; better and more satisfactory sinker-heads, needle bars, cams, and jack-beds; and many other important developments too numerous to mention.

The best method known to this author of chronicling the developments in the industry during the past fifty years would be to list

This full-fashioned machine, No. 1000, was built in 1918. It is a 20-section, 39 gauge footer, individually driven.



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chronologically the improvements in the *Reading* machine over this period. Therefore, the accompanying table has been made up with the idea in mind of presenting an overall picture of the full-fashioned knitting machine industry from the turn of the century to the present.

Year or Period	Development or Improvement ("READING" Machines)	Predominant Gauge		Machine Sections New Installations		Average Speed (Courses per Minute)	Mills in Operation	Machines in Place (All Makes)
		In Place	New Installations	Leg.	Foot.			
1898	Beginning of the full-fashioned machine industry in the United States. First practical machines built in this country by the Textile Machine Works of Reading, Pennsylvania. Machines were 16-section, 33-gauge, belt driven leggers and 18-section, 33-gauge footers.	30	30	16	18	40		
1900 to 1904	(a) The narrowing lifting device was added to the narrowing machine, which enabled the operator to lift the narrowing machine out of the operating position by hand, thus clearing the field for the performance of the welt turning operation. (b) Micrometer adjustment of the needle bar. (c) The 39-gauge machine came into the field in 1904 and predominated for the following six years, from the standpoint of style demand.	30	33	16	18	48		1,000
1905	Automatic band brake for the coulier motion, eliminating the abrupt stop by a pin for the performance of a narrowing operation.	30	33	18	18	48		
1907		*	39	18	18	48	33	
1909	(a) Individual motor drive introduced. (b) The open friction box, permitting the exchange of friction shoes without dismantling a part of the machine.	*	39	18	18	48		
1910	The 42-gauge machine came into use and was until 1923 the most popular style leader in the field, and its products brought the best prices.	*	39	18	20	48 to 62		
1913	Bell crank end stop lever for carrier rods.	*	39	18	20	48 to 62		
1915	Safety catch pin in the coulier coupling and the use of movable knockover bits.	*	39	18	20	48 to 62		
1917		*	39	18	20	48 to 62	79	2,078
1921	New, more efficient slurcam and jack-bed design, also a safety stop to prevent accidental start of the narrowing machine while in the rest position.	*	39	18	20	48 to 62		
1922	Reinforced selvage attachment for producing pointed heels; split motion stop; improved regulating mechanism; and adjustable needle bars.	*	42	18	20	48 to 62		
1923	This year saw the introduction of the 45-gauge machine into the market.	*	42	18	20	48 to 62		5,370
1925	New splicing mechanism, permitting universal use of all carrier rods.	*	42	18	20	48 to 62		6,780
1926		*	42	20	20	48 to 62		
1927	(a) The 48-gauge machine was developed during this year. (b) The Reading drum type automatic course counter was developed and put in use, a development which insured a uniform number of courses in each set.	*	42	20	20	62 to 72	187	10,545
1928	(a) The universal rocking device for footer was introduced. (b) Carrier rod shock absorber, resulting in a smoother operating machine and leading to increased speeds.	*	42	24	24	62 to 72	211	11,965
1929	(a) This year saw the introduction of the Reading short-needle high-production model introducing the jack spring bar on the jack-bed, and the BTA motor drive, which provided automatically adjustable speeds for knitting various sections of the stocking. (b) The lockstitch attachment was developed, furnishing the means for producing the attractive "picot" edge in the welt of the stocking, a style feature that has remained in demand.	42	45	24	24	62 to 72		14,310
1930	This year saw the introduction of the 51-gauge machine.	42	45	24	24	65 to 75	311	15,570

(*Table continued on page 259*)

Yes, no matter what fiber or combination of fibers you are using, you will find there's a Laurel Product that will give you exactly the finish you desire.

For over thirty-nine years Laurel has been meeting successfully myriad challenges of leading dyers, bleachers and finishers. From this reservoir of experience and service has come the long line of Laurel processing agents to give you better, more efficient processing for every dollar you spend.

Plan now to get the extra benefits Laurel Soaps, Oils and Finishes impart to your fibers or fabrics. Ask Laurel Technicians for their recommendations on your next processing job.

Laurel Boil-Off Oils and Compounds for more effective degumming of pure silk, rayon and cotton mixtures.

Laurel Emulsions and Softeners for better quality, better knitability, proper conditioning, proper regain.

Laurel Hosiery Finishes for softer, smoother appearance, greater freedom from snags, more wear.

Laurel Nylon Finishes for speedier processing, improved hosiery quality.

Laurel Olamine, cation active softener for exceptionally soft finish on dyed rayons.

Laurel Rayon Oils for faster, softer yarns, improved appearance and hand of your rayon.

Laurel Ruxite Coning Oils for superior lubrication, greater pliability, fewer breaks, higher winding efficiency.

Laurel Rayon Size for smoother, stronger, cleaner, more resilient rayon warps.

Laurel Textile Oil, a favorite of hundreds of customers because of its unusual versatility for improved quality and finish of fiber and fabric.

Laurel Wool Oils for maximum lubrication.

Laurel Wool Scouring Compounds for speedier detergent action, clearer, more even dyeings, cleaner, softer, loftier wool.

Laurel Special Finishes, Water Repellents, Mildewproofing and Flameproofing Compounds.

soaps, oils, finishes

LAUREL SOAP MANUFACTURING CO., Inc.

Wm. H. Bertolet's Sons

ESTABLISHED 1909

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Charlotte, N. C.

OFFICES:

2603 East Tioga Street
Philadelphia 34, Pa.

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1932	(a) Positive shock absorber for carrier rod control. (b) Oscillating take-up reel attachment for better control of the loop in knitting silk. (c) Double, underneath type lace attachment came into demand for the production of all-over mesh fabrics and lace clock designs.	42	45	24	24	65 to 75	319	15,300
1933	(a) During this year the well known three-carrier alternating, or ringless, attachment became standard equipment for all machines making silk stockings. (b) Air cushion brake for cam shaft, resulting in a smoother operating machine during the performance of a narrowing operation. (c) Balancing cams, reducing objectionable speed variation and accompanying shock to a negligible amount. (d) Overhead, or modified, lace clock attachment predominated for production of lace or mesh fabric. (e) Some 54-gauge machines were built on special orders, thus indicating the trend toward higher gauges.	42	45	24	24	65 to 75		15,000
1934	Half-speed shock absorber, which permitted higher speeds with decreased vibration and shock on carrier rods and carriers.	42	45	24	24	65 to 75	320	14,700
1935	(a) Eleven row chain motion, marking the rise of automatic features. (b) Wide sinker-heads.							
1936	(a) Automatic and semi-automatic features, such as, draw-off motion, regulating motion, and size counter for leggers. (b) The Conditionaire, providing a yarn conditioning and humidifying unit for each individual machine. (c) The Reading 30-section footer was placed on the market.	42	45	24	24	65 to 75		15,300
1937	(a) Improved center lace attachment for the production of all-over mesh fabrics and lace top designs. (b) Size counter for footers.	42	45	24	24	65 to 75	367	15,830
1938	Back-racking equipment for leggers became popular, providing the means for producing certain types of stockings complete on the one machine.	42	45	26	30	65 to 75		
1939	The 30-section legger was introduced into the field by Textile Machine Works.	42	45	26	30	65 to 75		
1940	(a) This year saw the introduction of both the hand-operated hook-up attachment and the automatic welt turner. (b) Combination legger-footer (duo-narrowing) machines built for export, and a number of domestic leggers converted for knitting the complete stocking with the conventional "diamond point toe."	42	51	30	30	65 to 75		
1941		45 & 42	51	30		65 to 75		
1942 to 1946	War Years. During this time constant research and experimentation was carried out, leading to the production of the post war full-fashioned machine.	45 & 42	51	30		65 to 75	497	14,310
1946 to Present	The 30-section duo-narrowing machine placed on the market for the production of the complete stocking. These machines are equipped with automatic welt turner, electronic drive, and other automatic devices for the production of high grade stockings.	45	51	30		70 to 80	475	11,548
1947		45	51	30		70 to 80	580	11,804

*No statistics available.

It is only natural that the table given in this article is incomplete, since to list all of the improvements or developments that have taken place in the field of full-fashioned knitting over the past fifty-year period would require entirely too much space.

It is believed, however, that the list given here is representative of the major improvements made in the field, not only by Textile Machine Works, but by full-fashioned knitting machine manufacturers the world over.

It is not consistent with past achievements to say that the full-fashioned machine cannot be improved further; when the status of the automobile or of the airplane of several years ago is considered and compared with that of today, the futility of making such a statement is seen clearly.

The trend in the knitting industry will be most likely toward finer gauge fabrics combined with suitable reinforcements for heel and toe portions, requiring machines that are both durable and flexible to a very great degree.

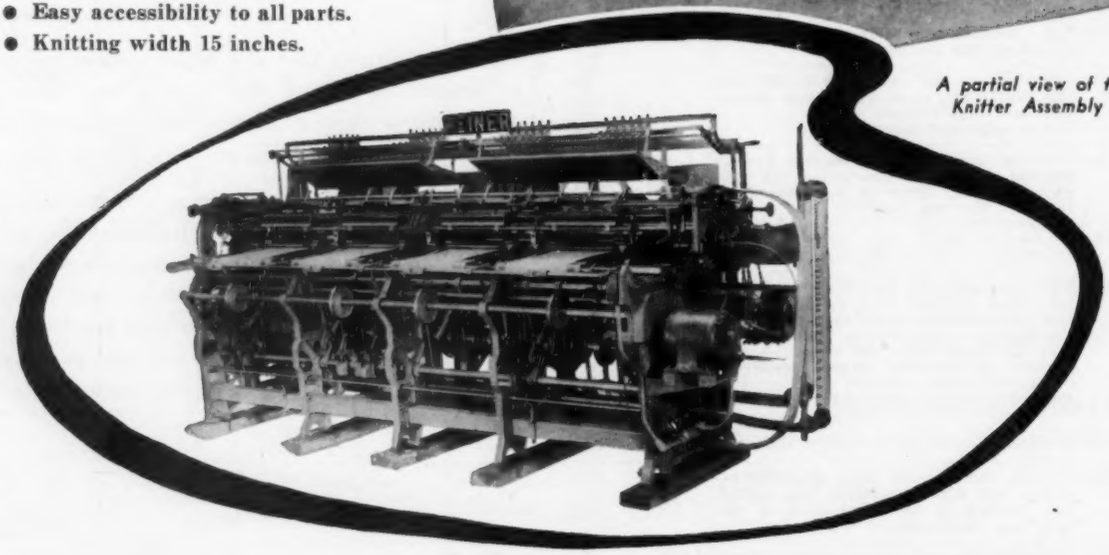
On the Assembly Line

The new Reiner Twin-Knitter Model TK-2, a full-fashioned hosiery machine, will soon make its appearance in hosiery mills, answering a definite demand by the public and the hosiery trade.

Some of the features of this remarkable machine are:

- **It is being offered in 60, 54, 51, and 45 gauge.**
- **Style flexibility comparable to large full-fashioned hosiery machines.**
- **Up to eight yarn carriers.**
- **High-speed knitting and fashioning.**
- **It knits 4 complete stockings in one single uninterrupted operation.**
- **Its simple design assures operation by unskilled help, male or female.**
- **Semi-automatic welt turner.**
- **Small unit dimensions permit utmost space economy.**
- **Low unit weight.**
- **Individual motor drive.**
- **Easy accessibility to all parts.**
- **Knitting width 15 inches.**

A partial view of the Twin Knitter Assembly Lines.



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Circular Hosiery Machines

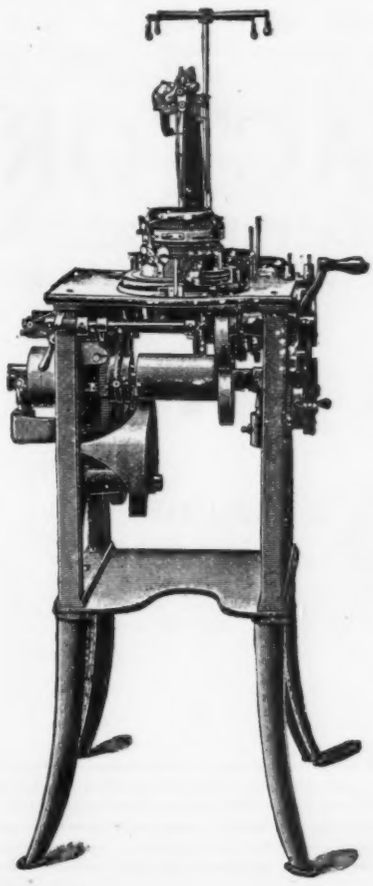
By W. E. SHINN
School of Textiles, N. C. State College

Early models of circular machines were mounted on tables. A study of different makes and the progress through the years.

THE MODERN circular hosiery machine is an outgrowth of earlier models which lacked many of the automatic features to be found on all present-day machines. The earlier power models were naturally similar in construction to hand operated models. These were commonly mounted on tables, and the original power driven hosiery machines were attached to table tops.

Early Machines. The early hand machines had been built with stationary needle cylinders and rotating cams. This principle of design had several weaknesses. In the first place the rotating cam ring was not perfectly balanced and tended to vibrate at high speed. The rotating cam ring also twisted the yarns when two or more were fed to the needles; this made plating impossible except with a rotating yarn table, which was not too satisfactory. The rotating yarn feeder also limited the number of yarns which could be introduced to the needles.

In spite of these limitations, some of the most successful of the early machines were built with stationary cylinders. The number of yarn feeders was limited to one, but a mechanism was developed which attached an extra thread to the leg yarn on beginning the heel and toe and automatically removed it at the completion of these parts. A machine of this class was the Acme Automatic Knitter built by Mayo Knitting Machine Company of Franklin, N. H., and later models built under the name of Mayo.



Acme knitting machine built by George D. Mayo about 1895.

Plating. Shortly after the turn of the century, machines were being advertised in which their plating possibilities were emphasized. These machines were built by Scott and Williams and featured stationary cams and yarn supply and moving cylinders. The machines advanced from table models and were mounted on legs.

A considerable portion of the cotton hosiery produced during this period had rib-knit legs which were transferred to the hosiery machine for knitting on the foot. The trade literature of the 1900-1910 period indicated H. Brinton Company as an active builder of hosiery ribbers. The machines of this type were equipped with automatic change to welt and slack course for half-hose tops, and ribbed legs with a two-speed drive permitting automatic shift to slow speed for knitting the welt and

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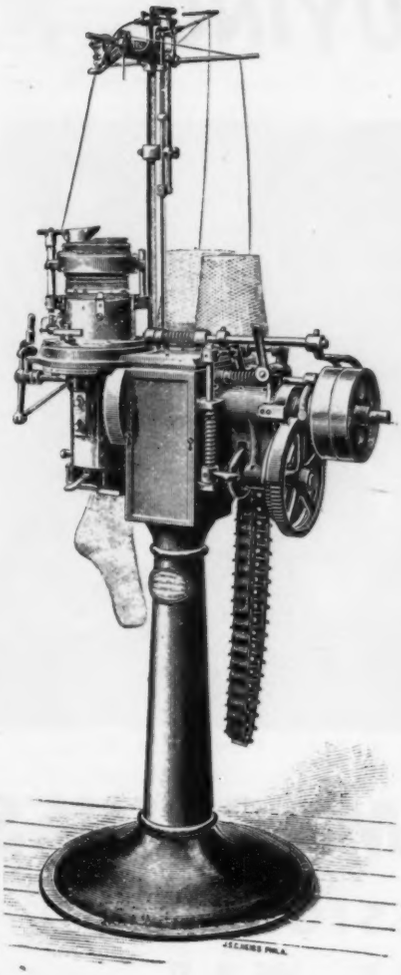


An 1895 knitter by John W. Hepworth Co., of Philadelphia, Pa.

slack courses. Later, a dogless device was added which served to hold the dial in fixed position relative to the cylinder without any contact points or dogs between which the fabric had to be drawn as it was delivered by the needles.

Seen at 1911 Philadelphia Show. At the Philadelphia Exhibition of Knitting Machinery in 1911, the Wildman Manufacturing Company of Norristown, Pa., exhibited a new hosiery ribber featuring a new two-speed drive and dogless attachment. The machine featured also the French welt with a selvage edge. This welt required independent knitting at two feeds, and the welt so formed was flat and of more uniform texture, had extra elasticity, and superior appearance. This style of rib top gained considerable popularity for use on the better grades of men's lisle and silk hosiery from both circular and full-fashioned machines.

Scott and Williams and the George D. Mayo Company exhibited their widely known lines of machinery jointly and had on exhibit some machines which were shown for the first time. These included a new patented automatic combined footer and topper with a new yarn-changing attachment for use in all gauges.

The Scott and Williams ribber was equipped with an automatic speed changer. The new Model B type Mayo machine was constructed with revolving cylinder and was adapted for yarn changing and plating. The Model C machine featured an inserted wall cylinder which permitted this part to be repaired easily in case of damage to the trick walls.

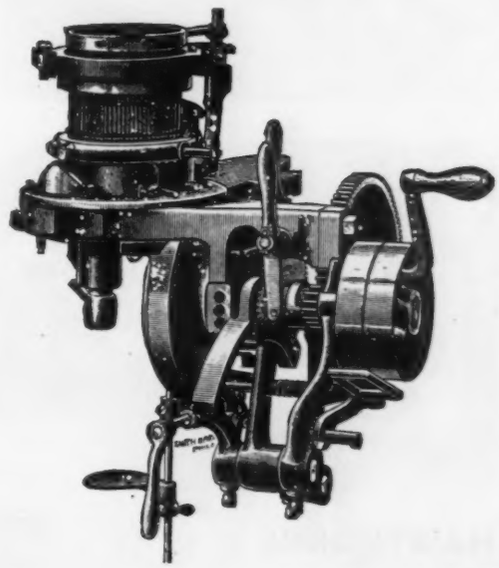
The Standard Machine Company had on exhibit a line of machines for making ladies' and men's hosiery with all the latest improvements for adding garter top, loose welt, automatic transfer adjuster, double sole, and high spliced angle attachments. The machines contained up to 240 needles. There were also 176-needle machines for making ladies' and misses' ribbed goods by doubling every other stitch.

The Hemphill Company of Pawtucket, R. I., exhibited the widely known Banner machines. One was a mercerized cotton hose for women. The other was operated on a silk plated hose for women. Both were machines of the "split foot" type. This machine, briefly described, was a two-feed machine capable of knitting the high heel, heel, sole, and toe portions of a different yarn from that used in the leg and instep portions.

This machine later gained considerable popularity in part-silk hosiery for both men and women. It made possible the knitting of extra weight into the heel and sole portions without the use of splicing or reinforcing yarns which always left a fringe at the line of joining of the sole and instep portions. This feature was also used to produce colored hosiery with white feet or silk hosiery with feet made of mercerized cotton or lisle.

The split-foot machine was improved in the years which followed and was used for the production of men's half-hose made of silk and mercerized cotton with transfer tops. The machines had up to 260 needles, and many are still in use for knitting the better grades of men's solid-color hose from nylon and mercerized cotton with transfer tops, and with attachments, for knitting rubber, which enable the machine to form its own top.

Model B. Subsequent advances in the Scott and Williams line of

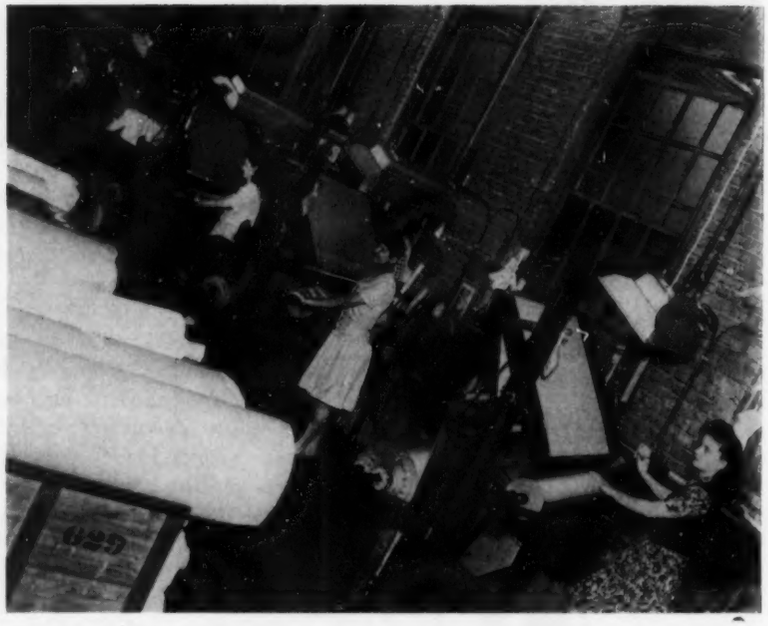


An 1898 model Scott and Williams knitter.

ALERT MILLS ARE BUYING . . .

(Right) Battery of Hermas Examining and Measuring Machines. Photo Courtesy of The Hellwig Dyeing Corporation, Philadelphia, Pennsylvania.

(Below) Clothroom installation at the Calloway Mills, LaGrange, Ga., and Hermas Shear, and Sewing and Rolling Machine at McGinley Mills, Phillipsburg, New Jersey.



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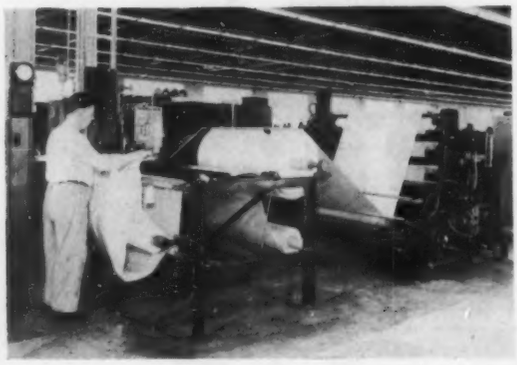

Hermas shears, brushes, examining and measuring machines, rolling and sewing machines, and other clothroom equipment have passed the supreme test of war and post-war production with honor and success.

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machines saw the development of the Model B machine with as many as five yarn feeders. This machine could be operated as a transfer machine, or with slight changes could be converted to knit full-length stockings. This was one of the most successful circular machines to be built, and many of them are still in use.

In many cases, attachments were added to improve the range of pattern possibilities. These included drop stitch attachments and striping attachments for knitting in color. The drop stitch or open work effects were obtained by use of drop stitch sinkers of various types. One drop stitch sinker protruded farther into the inside of the knitting cylinder and was raised up at the proper time to increase the length of the sinker loop at predetermined points around the stocking.

A similar attachment appeared on the Banner machines which forced in selected high-butt sinkers ahead of the knitting point to cause the forming of the stitch from the crown of the sinker. By spacing the high-butt sinkers at predetermined intervals around the cylinder, corresponding chains of long stitches resembling drop stitches were made in the work.

Scott and Williams brought out Models Q, O, G, and K. The Q-Model machine was similar to the Model B but had needle jacks and an extra needle routing device which enabled the machine to make-up or begin knitting automatically. The machine was thus able to separate its own work to drop it off the needles and start knitting again without attention from the operator. Earlier models had been able to continue the knitting of string work, but the units had to be hand-cut or torn apart by hand.

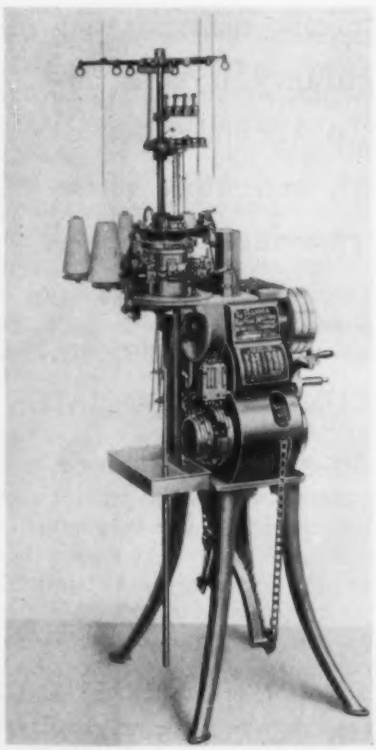
Model O was similar to Q, the only difference being the addition of an anti-runback course in the lower welt. The G-Model machine had an extra yarn feeding point which made it possible to feed an extra yarn to every other needle. This enabled the machine to knit an imitation ribbed top automatically and saved the operation of hand transfer of tops from a rib machine. This principle was similar to the methods of feeding rubber on more modern machines of the present time.

Model K. The principal feature of the Model K machine was an automatic inturned welt. Welts on ladies' goods up to this time had been sewed. The K machine eliminated this operation in addition to providing better stretch and appearance, and became widely used for women's seamless hosiery. In some cases the machines were made with a number of needles equal to that in full-fashioned leggers, and the tops were knit on circular machines, split, and transferred to the full-fashioned machine in an effort to reduce costs.

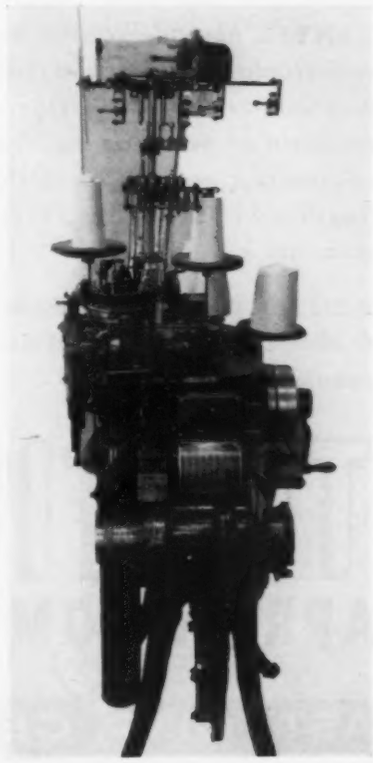
The Model K machine was improved, and about 1928 a Spiral K with 300 needles was introduced to the trade. The Spiral K was a tall-cylinder machine, and each needle was controlled by a 25-step pattern jack. The machine was thus equipped to knit pattern work in float stitch. The float-stitch principle was used both for pattern work and for control of the knitting in the spliced heel and sole portions.

Subsequent machines were built with as many as 400 needles, and new improvements included the gusset-toe which provided extra room in the toe. The machine was altered to knit the toe on the long butt side of the cylinder, thus placing the loopers' line under the toe.

These improvements occurred along with the development of nylon yarn which, in addition to providing the strength essential to knitting and performance in fine hosiery, aided greatly in producing a circular knit stocking with proper shape and leg contour. The heel formation was altered from the



Left, the 1926 split-foot machine. It was an outstanding development by the Hemphill Co. because it made the knitting of the high heel and sole independent of the instep and enabled each to be formed from separate yarns.



Right, the 1940 split-foot machine. It combines the principles of the earlier model with rubber top and other more modern features.

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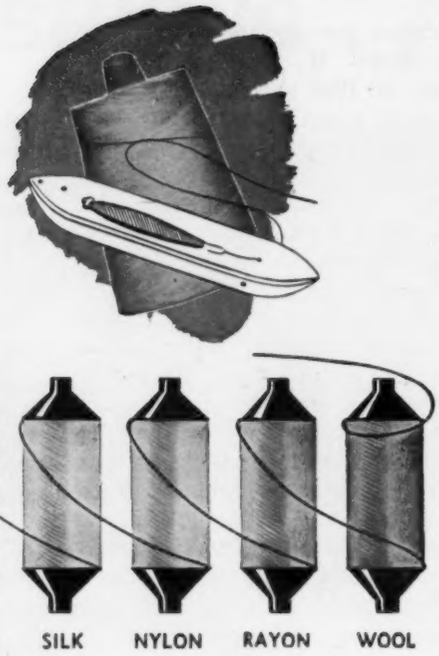

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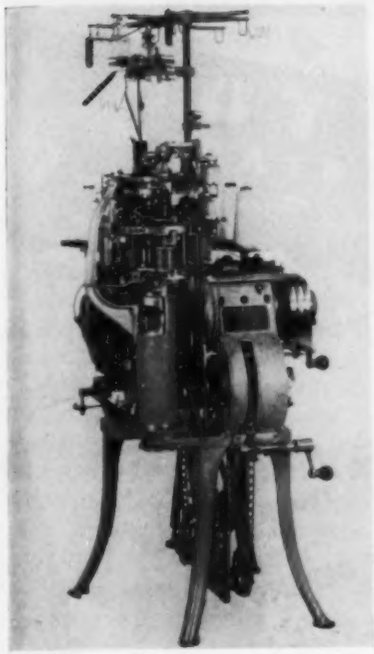
THIRTY YEARS' NATIONWIDE EXPERIENCE IN INDUSTRIAL AND TEXTILE DEVELOPMENT



The S&W 400-needle Dancing Twins no-seam nylon hosiery machine.

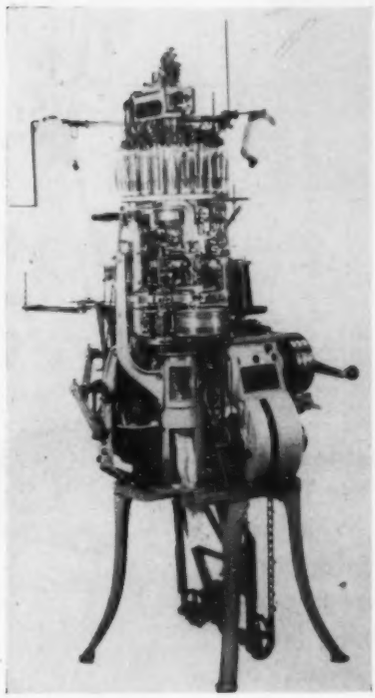
conventional methods, and with the introduction of the elevated or contour heel, the splicing yarn was no longer used.

In the half-hose field, designers of knitting machines had been busy working to accomplish the building of a machine which would knit a complete sock, including the ribbed top. The automatic transfer of a ribbed top seemed to be an insurmountable operation for a knitting machine to perform.

One designer partly solved the problem by building the machine to knit the hose backward. On reaching the top of the hose, dial needles were introduced to knit rib for the remainder of the length. The work was then pressed-off the needles and the welt finished by over-edgeing to prevent raveling. This machine was built by Scott and Williams under the name of Model RI.

The Model HH was an outstanding development in hosiery machinery. This machine knitted the hose in the conventional manner, and since it was equipped with dial needles, it was capable of knitting its own ribbed top and automatically transferring it to a series of needles which were kept out of action in rib knitting. This was made possible by use of a specially constructed compound needle which cast off its own stitch in a positive manner. The HH top is knit in true rib stitch, and especially with the rubber laying-in devices of the more recent models, possesses all the elasticity required in men's hosiery.

Pattern Knitting 1920-1940. The interval 1920 to 1940 also saw great progress in the pattern-knitting possibilities of half-hose machines. The new Hemphill Banner equipment included machines to do



S&W Model HH-PW full automatic knitting machine for making needle-wrap half hose.

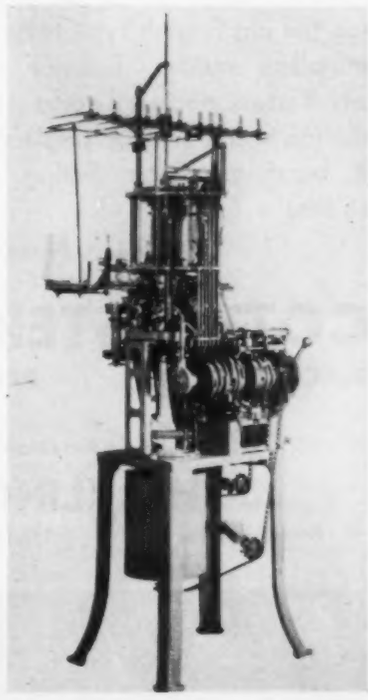
horizontal striping, reverse plating, and clock patterns by introducing extra wrap yarns. An early successful reverse plate machine carried a 12-step sinker reverse mechanism which gave a variety of patterns with a relatively small amount of work in changing patterns. The sinker was so shaped and mounted as to make possible stitch formation either in front of or behind the sinker hook. Knitting inside the hook caused the plating thread to cover and show on the face, while knitting behind the sinker reversed the threads and the color of the fabric correspondingly.

A Banner Jacquard machine operated in a similar manner and increased the design possibilities of the 12-step machine to 100 steps. The principles of reverse plating and needle wrapping were combined to produce the Banner Wrap Reverse machines which are currently being made. The extra embroidery or wrap yarns are used to accentuate and supplement the form and outline of the reverse plate pattern. In the case of diamonds and diagonals the wrap yarns are advanced and retarded in relation to the needle cylinder to cause the yarn to knit on succesive groups of needles as the hose is formed.

This machine features also the Banner Lastic top which is knitted with a predetermined or measured length of rubber yarn in each course. This and the no-curl character of the welt have made this one of the outstanding machines of the present day.

Outstanding among the developments in half-hose equipment by Scott and Williams was the spiral float first applied to both B and

Komet Links-and-Links hosiery machine by Scott and Williams.



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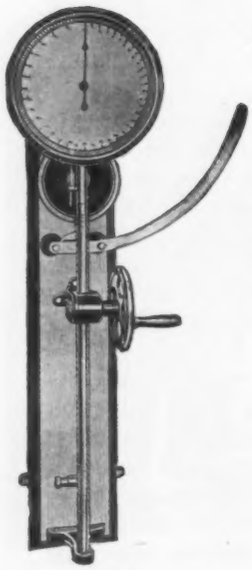
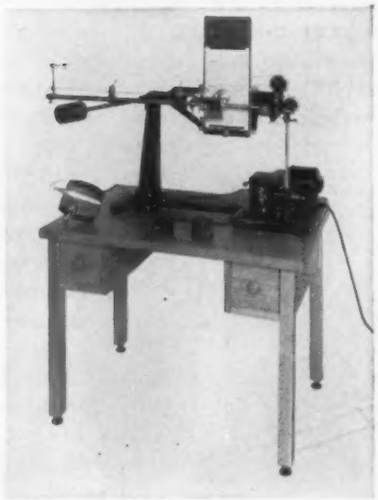
Textile Progress
1899-1948





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HH machines. This feature floated the plating thread instead of reversing it. Acetate rayon was widely used as a backing yarn in the leg and foot, and in combination with mercerized cotton and viscose rayon caused cross-dye effects in dip dyeing to be popular. The range of the spiral float machine was extended to 25 steps by applying a pattern drum, and the cost of pattern changes was lowered somewhat.

Meanwhile Stand-Trump Company had developed some machines for knitting half-hose which had many good features. The Model H had a chain striper which made it possible to change patterns quickly. A shoulder-type needle made it possible to produce float stitch on this machine. A cam was inserted far enough to reach the shoulder, and those needles which contained a shoulder would be depressed early and miss the plating yarn.

A machine embodying the principle of needle reverse plating followed which made reverse plate work with up to ten steps, and featured also a mock wrap attachment for making the semi-wrap work which marked the beginning of the modern needle-wrap machines of today.

80-W Shog. The 80-W shog machine which followed is an interesting machine. Built on the style of the original Trump machines, the machine has a wrap cylinder mounted coaxially with the knitting cylinder. The wrap cylinder contains wrap fingers for introducing the extra wrap yarns to the needle. The machine received its name from the fact that as many as 80 yarns, each a different color, could be knitted into the hose. By shogging or changing the position of the wrap cylinder relative to the knitting cylinder, the color may be caused to follow a diagonal path in the hose.

Other modern machines developed by Scott and Williams included the Komet, Komet Links-and-Links machines, and the Model HHPW. The Komet machine had been developed in England and became popular because of the demand for the well-known English broad rib hosiery. The plain Komet machine produced rib combinations with the rib extending to the toe. Its principal virtues, in addition to good appearance, were good fitting and elastic properties. The links-and-links feature extended the range of pattern work to figured effects in purl or links-and-links knitting.

The Komet machine is characterized by a second cylinder mounted above the regular cylinder. Double hooked latch needles work interchangeably between the two to give a wide variety of textures. The machine is a two-feed machine and the knitting of ingrain work with contrasting colors in combination with the texture effects of the links-and-links fabric are accomplished.

The HHPW is a wrap machine embodying the principle of needle wrapping with the HH top. The wrap feature is novel in that the wrap yarn is put on the needle in a simple manner without contact between the wrap fingers and the needles which are selected to receive the extra yarn.

Hosiery Statistics--1947

PRODUCTION OF HOSIERY BY GEOGRAPHIC AREAS

(THOUSAND DOZENS OF PAIRS)

	1947	1946	1945	1944	1943	1942	1941	1940	1939	1938
TOTAL INDUSTRY	190,598	157,333	125,041	141,925	160,882	147,002	140,868	126,975	140,662	125,206
Full-fashioned, Total[1]	59,875	48,323	36,748	38,595	58,868	55,185	61,918	61,968	48,871	41,583
Full-fashioned, North	44,005	44,335	26,781	29,080	44,507	40,590	45,572	45,444	47,384	47,142
Pennsylvania, incl. Del.	14,218	14,809	12,665	12,807	14,547	13,056	15,153	15,531	17,018	17,325
New Jersey, New York and New England	3,115	3,033	2,568	2,862	2,932	2,935	3,478	4,501	4,712	5,010
West and Middle West	2,674	3,493	2,578	2,151	4,157	3,559	4,964	5,200	5,652	4,808
Full-fashioned, South	15,870	16,987	15,050	16,515	16,453	15,595	16,337	16,457	16,575	16,440
North Carolina	9,862	10,720	9,043	9,655	9,332	8,965	10,060	9,422	9,309	8,251
Tennessee	1,949	2,036	1,766	1,776	1,876	1,862	2,002	2,036	2,171	2,159
Georgia	1,003	992	793	1,016	981	905	1,003	1,041	1,229	1,023
Balance of South	3,025	3,251	4,359	4,168	4,264	3,863	4,322	4,368	4,056	3,967
Seamless, Total	130,668	117,068	101,101	105,898	111,322	112,717	108,858	82,506	86,711	83,781
Seamless, North	44,768	43,983	44,403	43,450	44,618	46,103	45,731	44,482	44,743	40,546
Pennsylvania, incl. Del.	11,360	12,761	11,029	11,962	11,509	11,403	11,504	9,498	10,385	9,114
New Jersey, New York and New England	6,557	6,425	6,109	6,383	6,520	6,710	6,665	5,546	5,521	5,266
West and Middle West	6,965	6,816	6,455	7,334	8,788	9,991	9,562	9,238	9,519	9,166
Seamless, South	85,880	73,077	56,698	61,450	66,704	66,614	63,127	38,024	41,968	43,237
North Carolina	48,447	50,765	43,239	46,497	49,256	48,863	45,187	27,827	30,967	32,968
Tennessee	16,803	18,271	14,496	14,737	14,554	14,546	14,421	12,388	14,112	13,216
Georgia	10,952	11,858	9,670	10,593	10,807	11,601	10,932	8,986	9,258	8,684
Balance of South	11,885	12,203	11,085	11,756	11,787	11,806	11,777	11,013	11,631	8,469

PER CENT

Full-fashioned:	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	North	54.0	52.5	54.1	54.6	54.0	55.5	56.2	55.0	62.3	65.3
	South	46.0	47.1	45.9	45.4	46.0	44.5	43.8	45.0	37.7	34.7
Seamless:	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	North	20.8	20.5	23.3	23.3	23.5	23.3	23.8	26.3	23.5	23.3
	South	79.4	79.5	77.0	77.0	77.7	76.8	76.2	73.7	76.5	76.7

Courtesy, National Assn. of Hosiery Mfrs.

In 1947 the full-fashioned branch of the hosiery industry employed a monthly average of 59,810 operatives, a 3.1 per cent increase over 1946. The seamless branches of the industry employed a monthly average of 63,658 operatives, a 4.1 per cent increase over 1946.

Exports of all types of hosiery topped all records for the last 21 years, with a total of 7,524,756 dozen pairs.

Records of NAHM show that on December 31, 1947 there were 1136 hosiery manufacturing plants in existence, of which 543 produced women's full-fashioned hosiery and 593 produced various types of seamless hosiery.

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Body Knitting Equipment

By H. W. ANDERSON
Vice-President, H. Brinton Company

THE CHANGES which have occurred in circular knitting machines producing rib, plain jersey and design fabrics can perhaps best be described by comparison of illustrations.

Early literature of the H. Brinton Company, which has continuously manufactured circular knitting machines for more than 59 years, states that its plain jersey machines could be obtained in diameters from 7″ to 24″ and

A Pictorial Presentation

from two to sixteen feeds; one of these machines is illustrated in Fig. 1. Note the single speed belt drive, rope belt driven take-up reel, indicating slow speed of production, and the small number of feeds with long cam ring sections. The machine undoubtedly represented slow and careful workmanship, resulting in a well built but slow producing knitting machine.

By comparison refer to Fig. 2. This shows a more rugged machine incorporating the use of improved high carbon steels. Instead of a range of feeds from two to sixteen,

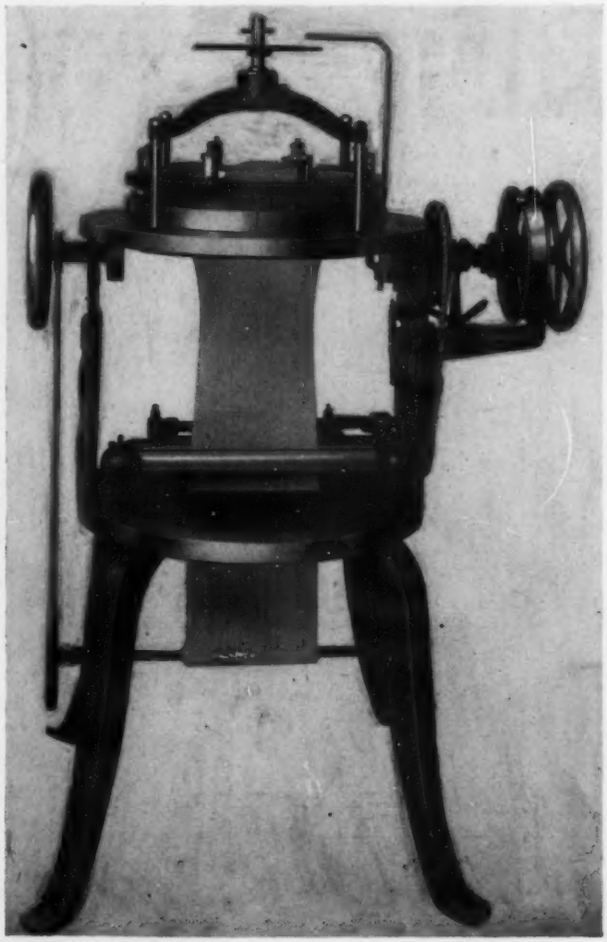
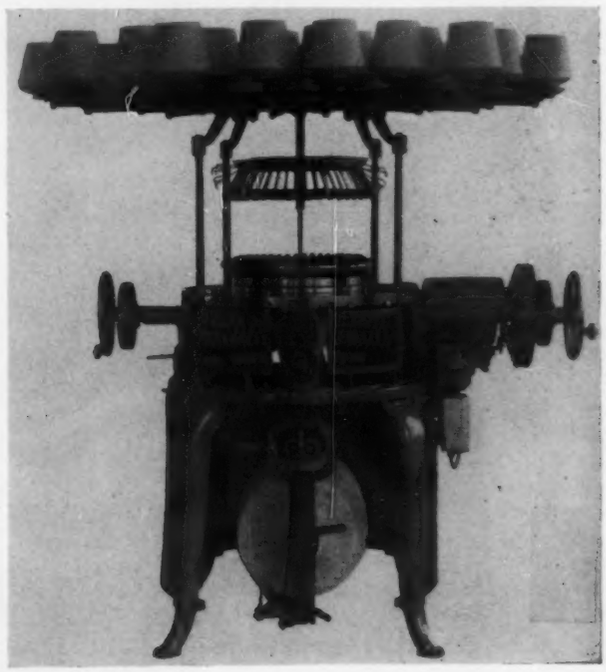


Fig. 1 (left). An early model plain jersey body knitting machine, sinker top.

Fig. 2 (below). A 16-inch, 44 feed, 22-cut Brinton style RMP plain jersey or balbriggan machine with wire safety guard removed.



the machines from 11″ to 26″ in diameter have from thirty feeds in the small diameter to sixty-four in the larger. Four times the production.

The machine operates directly from cones of yarns instead of bottle bobbins, thus eliminating one costly operation. Rotating take-up reel protected by guards, which when removed break an electric circuit, make it impossible to start the machine.

Electric stop motion permits one operator to tend many more ends with even less expenditure of energy than in the old days with fewer feeds.

Individual motor drive eliminates belts and assures more light and pleasant manufacturing space. Free wheeling permits even the most frail individual to turn the machine by hand easily.

In basic principle of operation, the movement of cylinder and dial needles has not changed over the years. The steel used in the cylinders, dials, and cams has improved immensely. The art of latch needle making has progressed. These items are the heart of the circular knitting machine.

In Figure 3 note the small number of feeds, only twelve in a 24″ diameter of machine. Todays modern underwear mills demand the most possible with no sacrifice in quality of fabric. The rib body machine in the 24″ diameter has 24 feeds—one feed per inch. The machine doubles the production when all items are given consideration.

An extremely rugged machine made of better materials with longer life at higher speeds is now produced.

Fifty years ago it was unknown to produce balbriggan or plain jersey cloth of superior quality at a speed of 70 to 80 yards per hour with latch needles to match the quality of the spring beard product. Today even, fine fleece fabrics are produced on modern machines.

Unlimited designs and colors producing blister stitches and grenadine combinations, blister and jacquard, interlock and welt stitch, result from new rib body machines, and unlimited striping patterns can be made on machines as shown in Fig. 4.

This article has been effected in a large measure through illustrations because 50 years ago there just weren't the machines invented, developed, perfected, and available that we illustrate and accept as a matter of fact today.

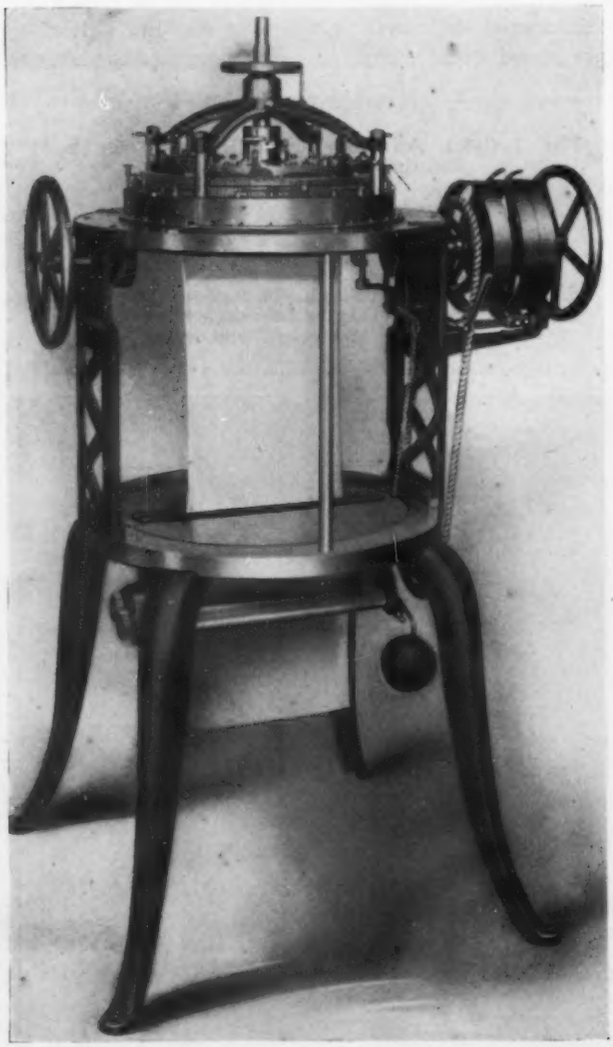
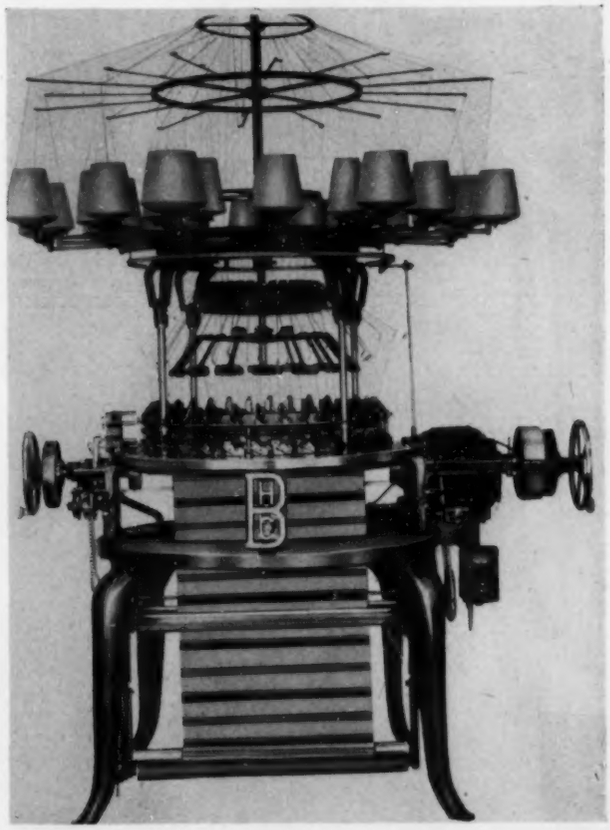
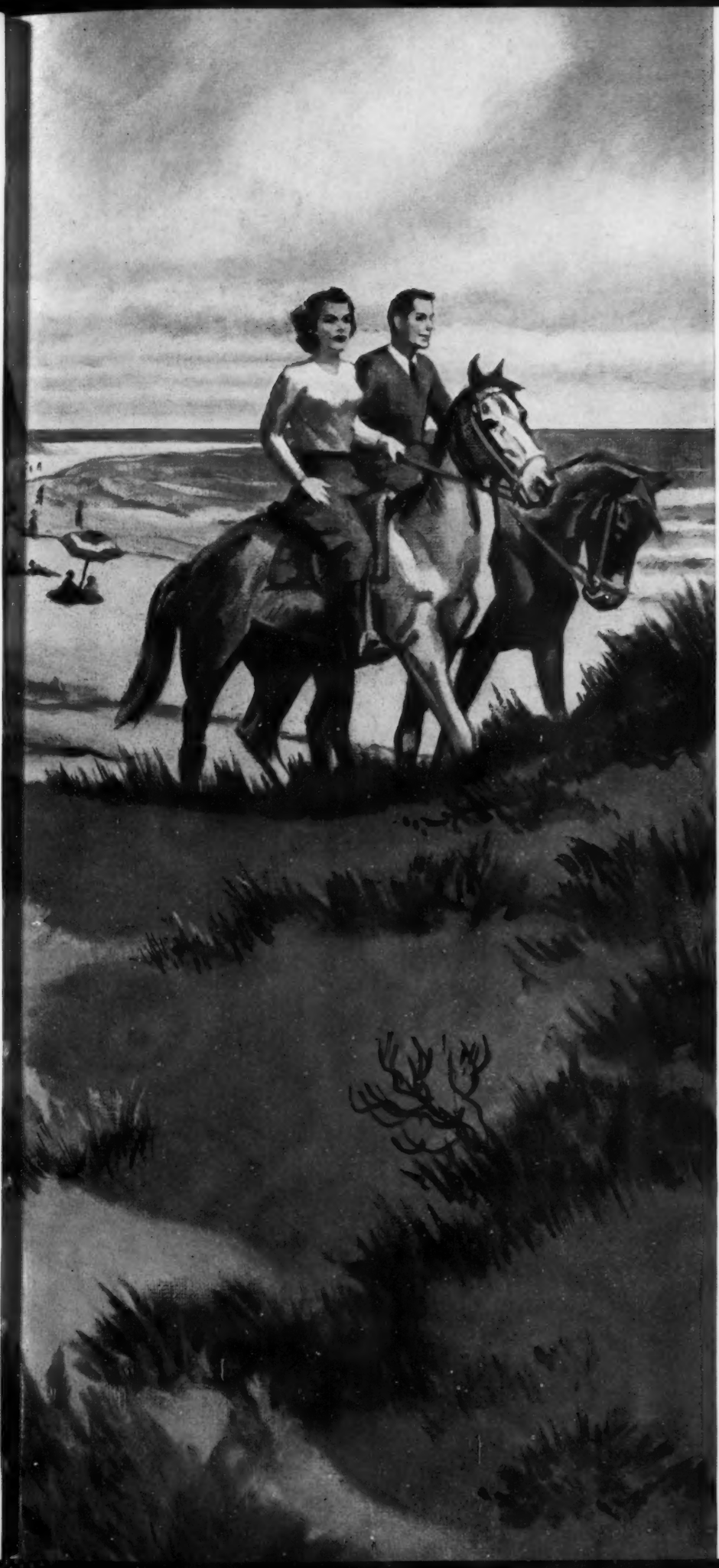


Fig. 3 (left). An old model plain shirt machine. It is a 24-inch machine with only 12 feeds.

Fig. 4 (below). A modern 24-inch, 32 feed, automatic striper sinker top machine. Machine is equipped with design wheels and split cams for welt and knit on all feeds, take-up on top of base, individual motor drive and electric stop motion.





The Vacation Fund Owes $700 to the New House Fund

Jim and Lottie have a budget. You can't say they "live on" a budget because the budget doesn't work.

It figures out perfectly on paper—so much for food, so much for rent, so much toward the down-payment on a new house, so much for entertainment, and so on.

"But," says Lottie, "something is always coming up—a chance to go to the seashore, a party that we can't afford to miss. The vacation fund is always in debt to the new house fund."

They laugh about it and say "After all it's our money," but sometimes they feel a little guilty . . . and wonder what they will do for cash when they decide they really must buy a new house.

Take a look at your last Financial Statement. Do you really have the money that you charged off for Depreciation in the past years? Is it part of your "current" assets . . . or is it earmarked as a separate fund under "fixed" assets?

Write today on your business stationery for your copy of "Good Housekeeping in Business"—a pamphlet which presents what we believe to be a *logical* basis for handling depreciation money. We will be glad to send it to you.

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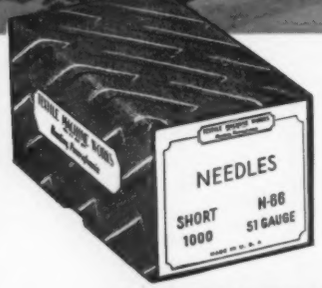

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TEXTILE MACHINE WORKS
Reading, Penna.

Knit Underwear Industry

By ROY A. CHENEY
President, Underwear Institute

Underwear industry anticipated and met its obligations to the public and government.

ALMOST 100 years ago, in 1850, the first power knitting machine for underwear began operations in this country in Cohoes, New York. Other plants sprang up and soon flooded the market with goods so that it became the custom to shut the plants down for several months each winter. As it has several times since, the government stimulated the industry during the Civil War with large purchases of heavyweight garments for the army. This association, the Underwear Institute, was founded in December 1865.

Growth of Industry. At the turn of the century Cohoes was well established as the knit underwear center of the country. In 1898 mills in the United States numbered 372, of which 87 per cent were located in New England and the Middle Atlantic States. The growth of the industry was steady, reaching a peak of approximately 450 plants between 1915 and 1923 when a shift in location from the North to the South was already well under way.

The number of plants declined rather rapidly after 1923, falling to about 245 in 1937 and has remained fairly steady. One contributing factor to the decline in number of plants was the growth of a dozen or more mass producing mills. Since the end of World War II a sprinkling of new plants has started up throughout the country, especially those making polo and T-shirts.

The number of knitting mills producing knit underwear, nightwear, and polo shirts increased to 275 in 1946 and at the beginning of 1948 to 302. The decline of the knit underwear industry in New England and New York State and the expansion in the South over the 50-year period is illustrated in Table 1.

In the early days production was almost entirely two-piece garments of flat knit fabric. In 1884 cloth made on latch needle rib machines began to displace the bulky flat knit garments. Spring needle rib fabric made its appearance in the 1890's and rapidly gained popularity because of its quality of retaining elasticity after repeated washings and wearings. Today there are many different types of fabric—plain and fancy rib, fine gauge balbriggan, interlock, and warp knit. Various fibers and blends of yarn are used—combed, carded, and mercerized cotton; wool, merino, and worsted; rayon, nylon, silk, etc.; and mixtures.

Basic styles in knit underwear because of the very nature of the garment do not change radically. However, there is one trend that has always been present with the consumer and that is to wear underwear lighter in weight, less bulky, in smaller pieces, with less body covering. In the face of this

TABLE I - Location of Knitting Mills Making Knit Underwear and Nightwear

(Figures indicate number of mills)

	Year 1898	Year 1948		Year 1898	Year 1948
Alabama	1	7	New Hampshire	5	2
California	3	0	New Jersey	6	4
Colorado	0	1	New York	164	39
Connecticut	18	3	North Carolina	3	13
Delaware	3	0	Ohio	6	3
Georgia	4	8	Pennsylvania	78	85
Idaho	1	0	Rhode Island	5	1
Illinois	4	6	South Carolina	0	1
Indiana	2	3	Tennessee	0	11
Maryland	2	1	Texas	0	1
Massachusetts	30	14	Utah	3	4
Michigan	9	4	Vermont	10	2
Minnesota	2	3	Virginia	8	10
Missouri	0	1	Wisconsin	5	5
			TOTAL	372	232

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Anti-Static Agent	Stantex No. 629	Static Inhibitor
Boil-Off Assistants	Pyrotex No. 121	Sulfonated Condensation product
Degumming Agents	Detersol	Soap and buffer salts
Detergents	Turpenol	Soap and solvents
Coning Oil for Nylon	Stantex NSP No. 125 and No. 127	Nylon coning oil
Coning Oil for Rayon	Stantex Coning Oil	Rayon coning oil
Delustrants	Duller No. 1110	Colloidalized pigment, light shades
	Dulstan	Colloidalized pigment, dark shades
Dye Fixing	Solidina	Alkyl aromatic addition compound
Dyeing Assistants and Penetrators	Pyrotex	Sulfonated condensation product
	Dyeing Oil	Sulfonated oils and solvents
Dye Retarding Agents	Retardine	Special mix for vat colors
Emulsifying Agents	Emulsifier Base	Specially treated sulfonated oils and fats
Finishing and Weighting Compounds	Voile Finish	Full, firm body finish
	Non-Slip Finish	Rayon and acetate satins
	Weighter Finish	Gums and weighters for acetates and rayons
	Standafin No. 109	Spun rayon
	Guminol	Weighter for rayons, acetates and spuns
	Gum Filler	Soft body, rayons, acetates and spuns
	Standafin No. 77; R-10	Permanent finish
Scrooping Agents	Scroop Oil	Special sulfonated and saponified oils
Size	Rayon Size	Blend of wax and gums
Staple Fiber Oils	Stantex No. 3005	Finishing oil for raw stock dyeing of staple fiber
	Stantex No. 3006	
Softeners	Standapol Oils	High sulfonated vegetable oils
	Stanteosine	Cation active softener
	Tallofin	Sulfonated tallow
	Rubinol	Sulfonated coconut oil
	Wax Cream	Blend of softening waxes
Splashproofing and Waterproofing Agents	Stantex Splashproof	Colloidal waxes and metal salt dispersion
	Stantex Waterproofing	Colloidal waxes and metal salt dispersion

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trend, the industry has survived only by using applied research, striving to improve—the fabric, the cut, the fit, sizing and finishing; and by expanding its production to include allied garments which may be made on underwear machinery.

When the unionsuit was introduced it had a rapid growth; it then fitted better than the two-piece garments; there was no double thickness through the middle of the body, and outer clothes set better with less bulk underneath. Then, as our living conditions improved with more evenly heated homes, schools, offices and factories, the demand arose for lighter garments.

The industry met this demand with sleeveless athletic shirts and a knee length drawer made either of woven or knitted fabric for men and boys, and a vest and bloomer or panty for women and girls. In 1934-35 the supporter type briefs and drawers for men were developed, following the introduction of the snug-fitting tuck-stitch and woolies garments for women and girls.

Demand for T-Shirt. The only exception to the consumer demand for lighter underwear came about as a result of World War II. Some regulation service shirts are quarter-sleeve garments similar to the T-shirt. Young men became accustomed to this type of shirt, liked the comfort of its extra protection from perspiration and because it could be worn either with or without an outer shirt for sports or work. It will be interesting to see to what extent this garment replaces the sleeveless athletic shirt over the next few years.

The forerunner of the present polo or T-shirt was a knitted work-shirt first introduced by the underwear industry about 50 years ago. The polo shirt proper was introduced about 30 years ago. Some underwear industry executives claim to have witnessed the use of the polo shirt in England and brought the idea back to manufacturers in this country where the garments jumped into unusual popularity in 1934-35. More recently many outerwear manufacturers as well as cut-and-sew establishments have gone into the manufacture of these shirts because of their immense popularity for all ages. In fact, much of the new knitting equipment that has been installed since the war has been for the manufacture of fabric for the so-called polo shirts.

The true polo shirt is a knitted shirt with a collar and an opening part way down the front. The T-shirt is a crew neck garment usually plain white or with colored trim around the neck and sleeves; the Basque shirt is a T-shirt with stripes.

Mr. Cheney.

Knit Underwear Mills of Two Types. Underwear mills equipped with knitting machinery are, as a rule, located in small towns, whereas the typical garment industries are predominantly concentrated in and around large metropolitan centers. A study made by the Institute in 1934 brought out the fact that 59 per cent of industry mills were located in towns with a population of less than 100,000, 22 per cent being in towns of less than 5,000 inhabitants.

There are two entirely different types of establishments making knit underwear; the first, known as full-process mills, are equipped with knitting machinery and either buy or spin yarn, knit the fabric, and perform all operations along to the finished garment. In addition to some 200 mills of this type in the industry at the beginning of 1948, there were also more than 250 cut-and-sew mills. As the name implies, these are establishments which own no knitting machinery but purchase knit fabric and cut and sew the garments. This departure from the fundamental mill organization of the industry came about with the introduction of knit rayon for underwear about 1925.

Rayon Introduced Style. The manufacture of knit cotton-wool underwear until recent years has been entirely a full process business. With the use of rayon and the opportunity for the promotion of knit underwear on a style basis for almost the first time in its history, many small plants spring up with only cutting and sewing equipment. This type of establishment for the most part is located in metropolitan centers and in many instances produces underwear of woven fabrics in addition to knit.

One of the chief factors in this separation of knitting from the finishing of garments was perhaps due to the fact that some of the large rayon yarn producers integrated into the fabric knitting business. There are some full process rayon underwear mills, both circular and warp knit,

TABLE 2 - Production of Knit Cotton/Wool Underwear

	1899	1946
Two Piece Garments	15,873,700 dz.	36,433,000 dz.
Unionsuits	986,855	3,355,000
	16,860,555 dz.	39,788,000 dz.

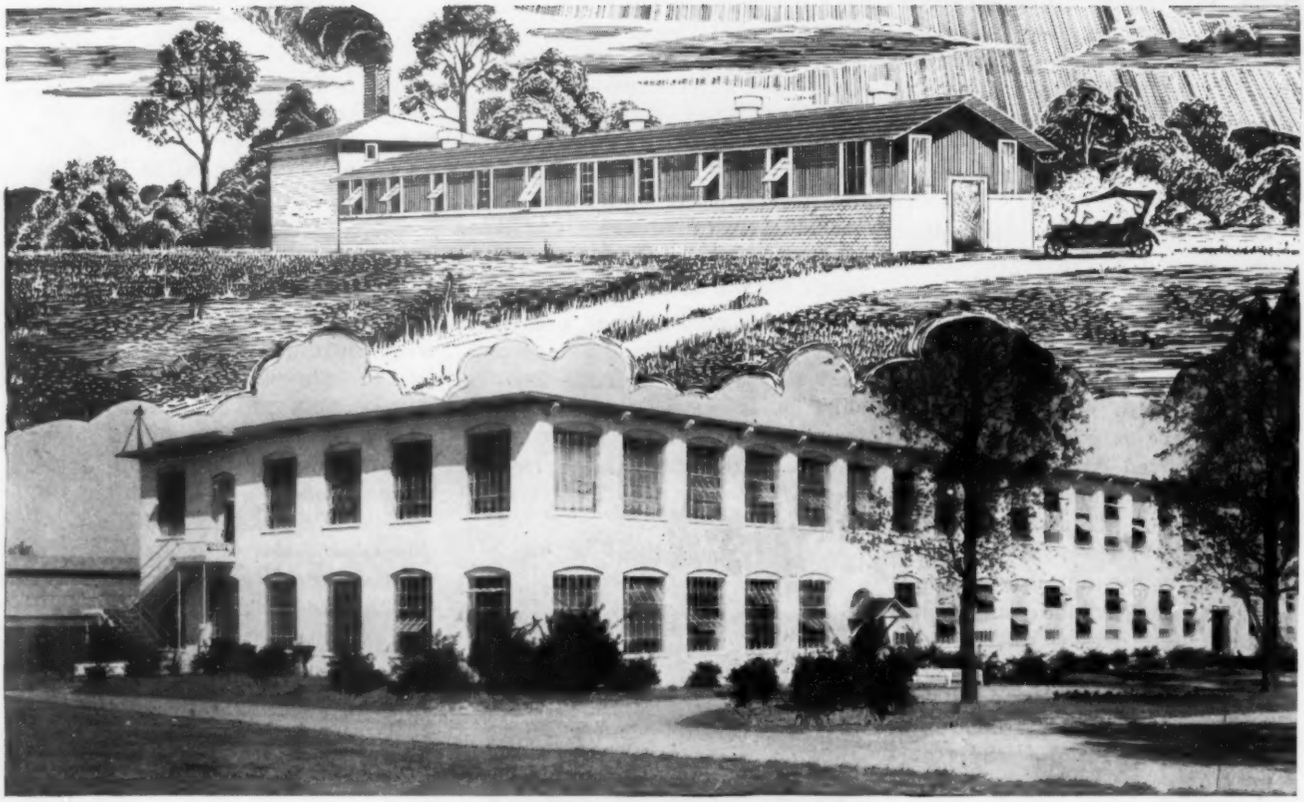

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TABLE 3 - Production of Knit Underwear & Nightwear, all Fibers

	1946 Production in Dozens
Men's Garments	17,917,000
Women's Garments	22,464,000
Boys' Garments	3,245,000
Children's Garments	7,784,000
Infant's Garments	7,886,000
	59,296,000

accounting for about 20 per cent of the production, but the bulk is made by cut-and-sew mills.

Since its introduction as a knit underwear fiber, rayon has been used mainly for women's and children's garments, resulting in a sacrifice of business on the part of manufacturers of women's knit cotton underwear. In 1946, 58 per cent of knit underwear made for women was of rayon. A comparison of the total production figures for the 50-year period are interesting. (See Table 2, page 277).

A further breakdown by classes of wearers for 1946 is shown in Table 3.

Raw Material Consumed and Value of Shipments. In 1946 the industry consumed a total of 141,161,000 pounds of yarn and 42,997,000 pounds of purchased knit fabric. The fiber breakdown on this is shown in Table 4.

Employee Earnings and Company Profits. The knit underwear industry is an essential industry and offers congenial, light, and clean work to its employees who are mainly women and girls. Chart A indicates clearly that the industry has more than kept pace with the cost of living. Chart B is evidence of the rise in cost of raw material and labor with the resulting increase in the price of the finished product. (See page 281 for charts.)

Unfortunately, wage and hour data for 1899 are not available. In 1914 the Bureau of Labor Statistics made a study of 40 knit underwear mills, the results of which are given in Table 6, with comparable data from an Underwear Institute study made in 1946. In 1914 the weekly hours for females were 54 and for males 55. In 1946 the scheduled hours per week for the majority of mills were 40.

Profit Ratios. The history of profit ratios in the knit underwear industry, according to a study made by Dun and Bradstreet for the years 1918-44 inclusive, is one of change; seldom was the trend continued in one direction either up or down for more than two years. The only exception, so far as profits after taxes were concerned, was during the long decline from 1927 to 1932. During the period in the study—1918 to 1944—for the companies surveyed, the average ratios of aggregate profits to aggregate sales were about 4.1 per cent after taxes. The yearly figures ranged from a profit of 8.2 per cent in 1927 to a loss of 4.2 per cent in 1932.

TABLE 4 - Materials Consumed in the Knit Underwear Industry During 1946

(Thousands of pounds)

	Year 1946
Yarn Consumed — Total	141,161
All Cotton	121,914
All Rayon	7,954
All Wool	978
Cotton - Wool Mixtures	9,582
Other Mixtures	733
Purchased Fabric - Total	42,997
All Cotton	14,779
All Rayon	27,348
All Other	870

The Industry in Wartime. Knit underwear is a prime requirement for the soldier and sailor. Therefore, the industry is as essential in war as in peacetime. During the last war the industry produced more than 686,800,000 garments for all branches of the services and many additional thousands of garments for war relief. All of this vast production was in voluntary cooperation with the government as none of the industry's equipment was frozen at any time during the conflict. The record of the industry and of the Underwear Institute can be best described in the words of Brigadier General Roland Walsh, then Commanding General of the Philadelphia Army Quartermaster Depot, at the War Conference of the Institute in Philadelphia in 1944:

"[The Underwear Institute] emphasized the importance of manufacturers becoming interested in army requirements during the period of the national emergency, before our country got into the war. With unusual foresight your Institute made arrangements for contractors who were familiar with the construction of army underwear to open their plants to other interested manufacturers and actually give instructions in production methods to firms which had been their keen competitors in the civilian field.

"As a matter of fact, the underwear industry has always been aggressive in handling army requirements. It has frequently taken the initiative, working out solutions to specific problems before they became acute. It was recognized at the outset that army requirements called for underwear of a different type than that produced by the majority of firms during prewar years. Your industry put its shoulder to the wheel, brought out of storage machines that had lain idle for years, re-equipped them, and established production lines involving types of sewing which differed materially from those customarily used for civilian goods. Many mills whose output had been confined exclusively, or almost exclusively, to children's and women's underwear, willingly made such readjustments as were required to produce army underwear."

Improvement of Product. The progressive element of the industry is ever on the alert to improve products and to develop new

TABLE 5 - Value of Net Shipments in the Knit Underwear Industry During 1946

Total	$289,555,000
New York & New Jersey	91,628,000
Pennsylvania	73,903,000
South	52,605,000
Middle West	44,417,000
New England	22,916,000
Far West	4,086,000

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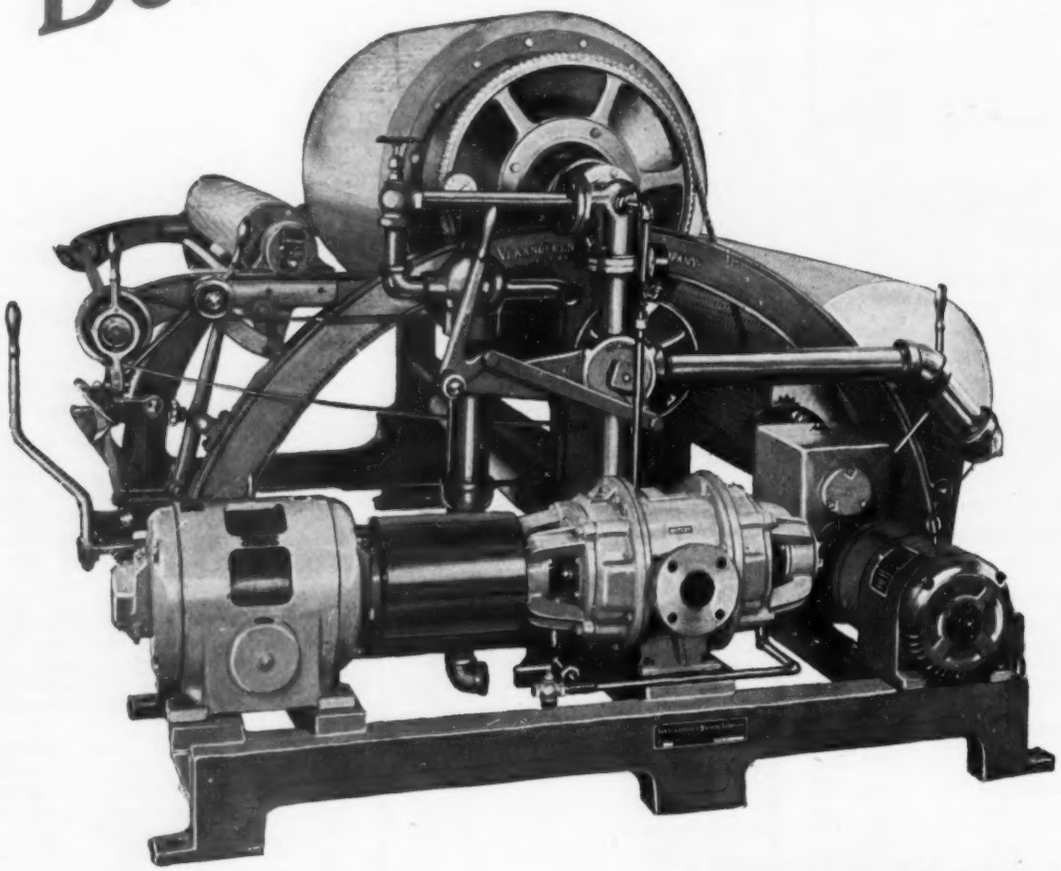

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The blanket you use can affect the production of your decating machine—its porosity is important. We periodically test the porosity of Van Vlaanderen Blankets so you will get better production.

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features to increase sales. Many mills maintain their own research and development departments; mills also retain fashion experts and stylists. Style is not too much a factor in the staple knit cotton-wool garments, but style is a decided factor in rayon garments, especially warp knit or tricot. Underwear and nightwear of warp knit fabric are now as daintily trimmed and delicately tinted as the finest woven garments. The warp knit branch of the industry has had a phenomenal growth in recent years, and the use of nylon yarn opens up wide possibilities for the future.

TABLE 6 - Comparison of Operational Average Hourly Earnings in Knit Underwear Mills

	1914 Av. Rate Per Hour	1946 Av. Hrly. Earnings	
Male			
Hand Cutters	$ .243	$ .951	(male and female)
Knitters	.229	1.046	
Pressers	.207	.878	(male and female)
Female			
Wind	.158	.938	(male and female)
Knit	.147	.939	
Hand Cut	.171	.951	(male and female)
Seaming	.176	.885	
Buttonhole	.199	.862	
Inspect & Fold	.147	.854	

Next to shrinkage, perhaps the merchandising problem most vexing to knit underwear manufacturers is proper size measurements and identification. The Underwear Institute many years ago, in cooperation with the National Bureau of Standards, developed and promoted standard sizes for all the basic styles of knit underwear.

The procedure in this undertaking was to obtain the prevalent dimensions and methods of measuring used by all producers and then to develop these figures into an average based on actual experience. Using these averages as bases, proposed standard measurements were developed and presented to the industry's Standardization Committee for final consideration, together with garments modeled according to proposed measurements.

The Bureau of Standards called a conference of producers, distributors, and consumers of knit underwear and, when the proposed standards had the approval of these groups, they were then promulgated as official commercial standards for the industry.

The knit underwear industry was among the first, if not the first, of textile manufacturers to adopt standard sizes and measurements for its products.

The government project of sizing apparel in accordance with body measurements has been investigated by the industry. In

CHART A. (Referred to on page 279).

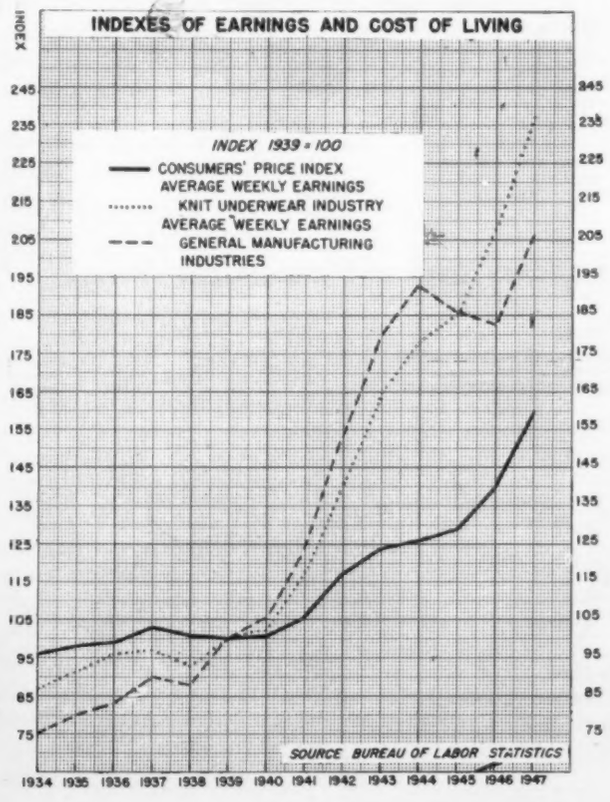
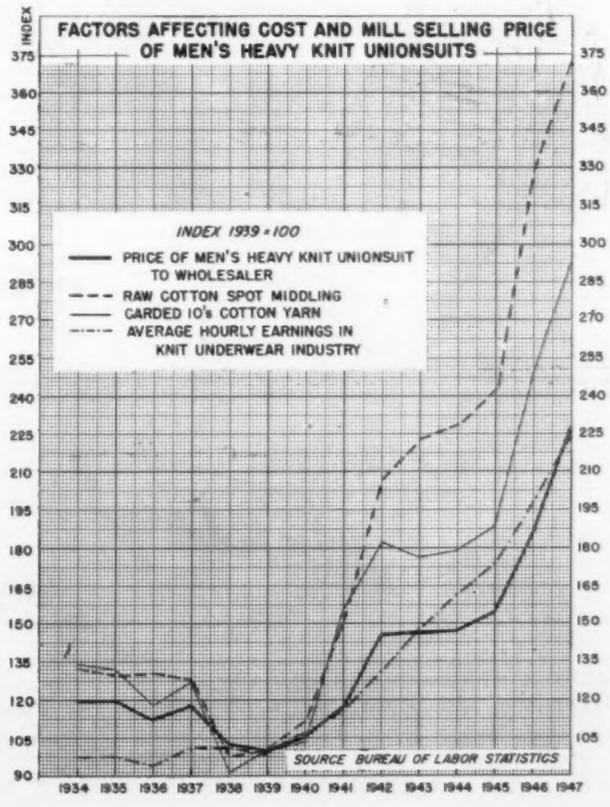

INDEXES OF EARNINGS AND COST OF LIVING
INDEX
INDEX 1939 = 100
CONSUMERS' PRICE INDEX
AVERAGE WEEKLY EARNINGS KNIT UNDERWEAR INDUSTRY
AVERAGE WEEKLY EARNINGS GENERAL MANUFACTURING INDUSTRIES
SOURCE BUREAU OF LABOR STATISTICS
1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1947

CHART B. (Referred to on page 279).


FACTORS AFFECTING COST AND MILL SELLING PRICE OF MEN'S HEAVY KNIT UNIONSUITS
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INDEX 1939 = 100
PRICE OF MEN'S HEAVY KNIT UNIONSUIT TO WHOLESALER
RAW COTTON SPOT MIDDLING
CARDED 10's COTTON YARN
AVERAGE HOURLY EARNINGS IN KNIT UNDERWEAR INDUSTRY
SOURCE BUREAU OF LABOR STATISTICS
1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1947

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January of this year a conference of infants' and children's underwear manufacturers was held, at which Mansfield Lonie of the National Bureau of Standards explained this entire project of body measurements as it applies to knit underwear. When the majority of the manufacturers have signified their approval of the government's studies on body measurements, the Institute's standards will then be revised to conform.

The Institute revises existing standards and develops new ones from time to time as the demand arises. Recently, standard minimum measurements on men's and boys' woven cotton athletic shorts were set up in cooperation with the Bureau of Standards. Currently, the Bureau is working on measurements for men's knit rayon shirts and shorts. When these are completed, the next garments to be standardized will probably be women's knit rayon garments.

Trade Practice Rules. Long before Congress passed the Wool Production Labeling Act of 1939, the Underwear Institute, working with the Federal Trade Commission, developed trade practice rules requiring the accurate labeling of part wool underwear. These rules required that the manufacturer state within a specific tolerance—3 per cent plus or minus—the wool content of the garment.

Redman Shrink Process. Shrinkage is a real problem with knit underwear manufacturers. For this reason the industry lent a ready ear to a project outlined to them at the Institute's annual meeting in Philadelphia in 1944. Frank Redman had patented a process for the shrinking of knit fabric by mechanical means. After investigation, the Institute's Executive Committee decided the project had merit and that they should proceed with its development. For this purpose a trusteeship known as the Trustees of the Redman Trust was created. Contributions were solicited, and after considerable time and work on the part of various committees and the Institute's staff, an experimental machine for shrinking knit fabric has now been built by Proctor & Schwartz and installed at the Spring City Bleach and Dye Works in Pennsylvania.

Experimental runs which have gone through the machine are very satisfactory, and members of the Quartermaster General's Office, the trustees, and their technical committee are enthusiastic about the future of the process and what it will mean to the industry. An open-house day at which all contributors to the fund were invited to view the process in operation was held recently. The industry feels that when the time comes that all knit fabric is "Redmanized," the problem of shrinkage will be licked.

A Look to the Future. The underwear industry has been working at capacity so far as labor and raw materials will permit since the end of the war to catch up with accumulated civilian demand. In spite of this, the majority of knit underwear production is still on an allotment basis. Although prices are up, they are not exhorbitant in relation to increases in wages and raw materials (See Chart B). With the tremendous birth rate of the last few years, manufacturers of infants' and children's garments can look forward to good business for many years to come.

Circular knit rayon garments have usually found a ready market because they lie in the popular price field. The use of nylon yarn in warp knit garments and the adaptability of this type of fabric to high style bids well for the future of this branch of the industry.

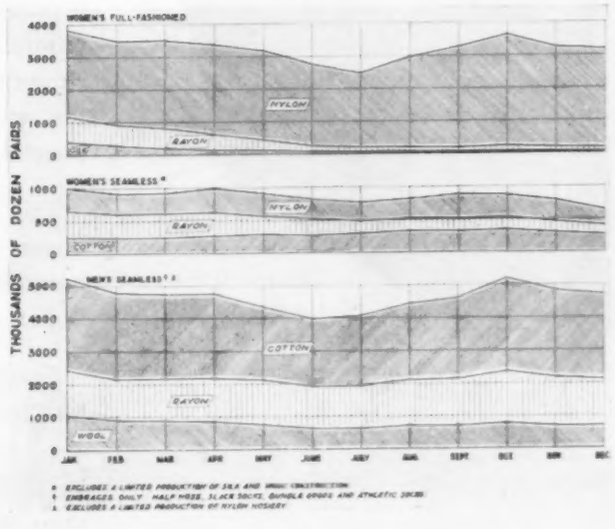
As for staple knit cotton-wool garments, nothing has yet been discovered to equal them for comfort and durability. Knit undergarments are comfortable because of their elasticity. This provides a snug fitting undergarment that gives under strain. Knit fabrics are durable because they give without breaking the threads. The garments provide long wear because the fabric stands up under friction and the seams do not pull out. Knit fabrics are healthful for underwear because the tiny air spaces permit the body to breathe and allow moisture to evaporate. Knit fabrics are practical because they are easily washed and do not require ironing.

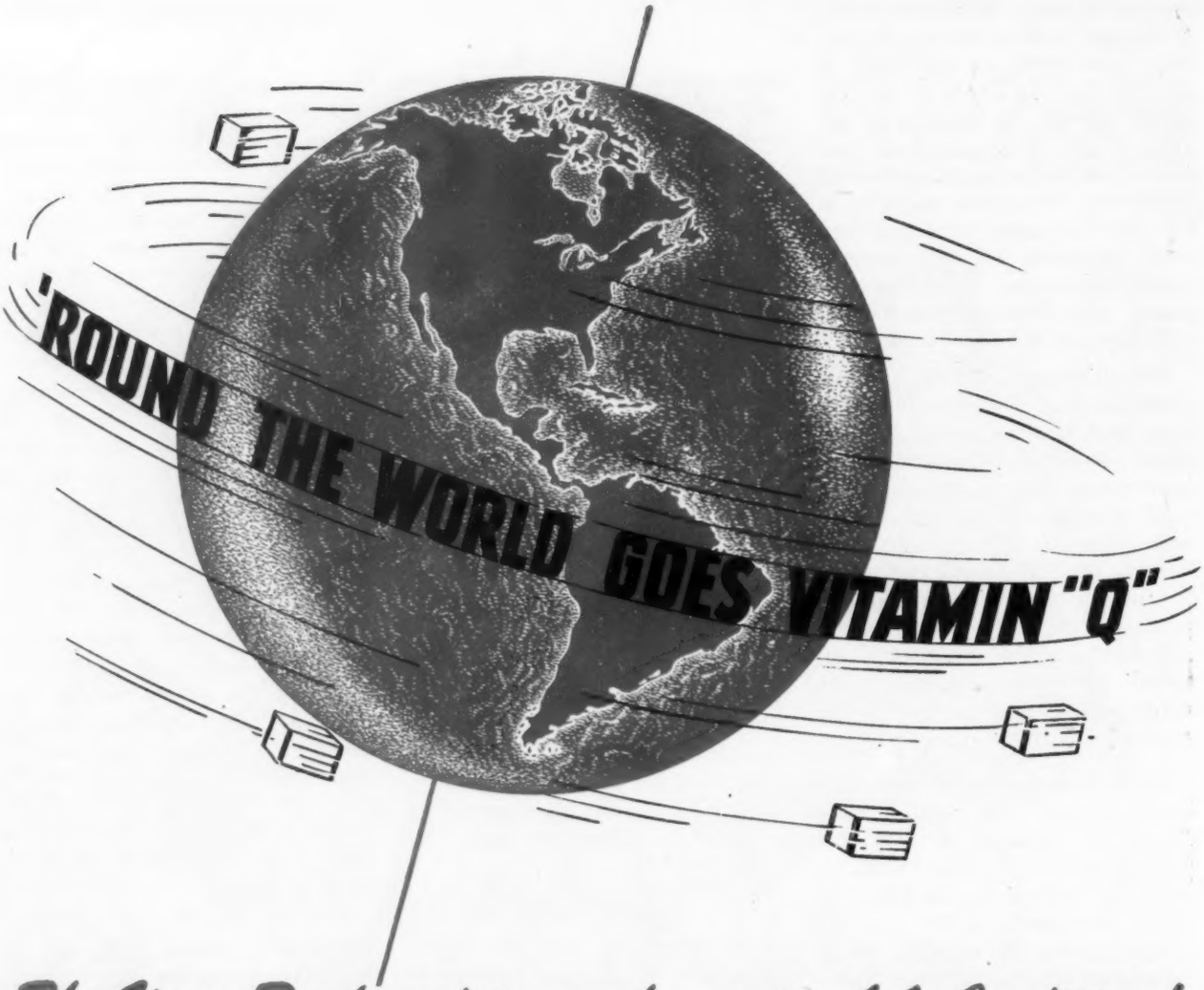
The market for the industry's products is greater than ever before. Manufacturers offering quality garments at a fair price can look with confidence to the future.

PRODUCTION OF HOSIERY BY FIBER

During the Year 1947

Courtesy, National Assn. of Hosiery Mfrs.





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50 Years of Progress in the

Knitted Outerwear Industry

By SIDNEY S. KORZENIK
Executive Director and Counsel
National Knitted Outerwear Association

Knitted outerwear, a 700-mill industry which had more than 365 million dollar business in 1946. A good customer of the yarn mills.

THE KNITTED outerwear industry is an outgrowth of the hosiery and knitted underwear trades. As such, it is of more recent origin. Its history is a history of the manufacture of those knitted articles which, like sweaters, swimsuits, and infants' wear, were first minor derivatives from the knitting arts regarded as novelties and more frequently called, "fancy knitgoods."

As a business of noteworthy proportions, the knitted outerwear industry found its origin when public taste and interest in such items made it necessary to class them no longer as specialties, but as regular staple products of trade.

History of Development. In the main, the early products of knitted outerwear — the specialties — appear to have been of two kinds: athletic specialties, such as athletic shirts, trunks, and sweaters; and knitted tights for use by theatrical troupers and chorines.

Knitted garments were found especially valuable for athletic use because of their elasticity and comfort. And, of course, knitting served the chorus girl of those days because she could comply with the legal requirements of public modesty by clothing her "limbs" in silk tights without having her snug-fitting silk mesh reveal unsightly wrinkles.

Such, strange to say, were the humble beginnings of the branch of the knitting industry which, in 1946, produced a total volume of approximately $365,000,000 worth of goods. Thus, origins go back to the last few decades of the past century. The sweater was not yet an article of ordinary apparel outside of its athletic setting; and athletics, of course, in those days were indulged in neither so commonly, nor by so many people as they are today.

The sweater, as its name implies, was used principally by the doughty bearded and moustached athletes of the day. These garments were of two kinds, light and heavy, the former being worn frequently during the activity and the latter being donned after the period of exertion in order to stave off a chill from the perspiring wearer.

Nor were bathing suits articles of such wide prevalence as they are today; for bathing at the beaches was not so common.

Beginning thus, a complete history of the knitted outerwear industry must consist of the histories of the several articles produced by knitted outerwear manufacturers. It would have to trace them from their slow beginnings, through the days of their popularity and down to their disappearance, when they are swept away by the fickle hands of style. Our story is therefore concerned in part with the changing of tastes of the times, and how knitgoods manufacturers pleased them. It deals, to an extent, with the fads and fancies of the changing decades.

Cardigan. About the year 1897 a heavily knitted and reinforced jacket known as the cardigan came into prominence and enjoyed fair popularity for several succeeding years. It seems to have owed its popularity greatly to its extensive use by gold-seekers who were attracted to the Klondike region about that time. It came to be used by many outdoor workers. It was constructed to allow easy movement and afford great warmth; and its durability was so famed that it was often said that the use of the cardigan became ancestral and it could never wear out.

Turtle-Neck. The slipover sweater with the snug turtle-neck was in extensive use among the college youth of the country. It became especially popular when bicycle-riding was a most fashionable outdoor sport, and it was worn by female as well as male pedalers. This type of sweater became the proper mode for all bicyclists. As good memories will

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These glamorous gold, silver and copper yarns can be used and sold with confidence. Lurex overcomes all of the limitations that formerly restricted the use of metal in *wide loom* fabrics.

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recall, bicycle clubs were formed everywhere, and it was a common sight to see groups of men and women donned in such slipovers scorching the roads on their historic two-wheelers. But it must be borne in mind that the sweater in the main was still an article of athletic or general outdoor use.

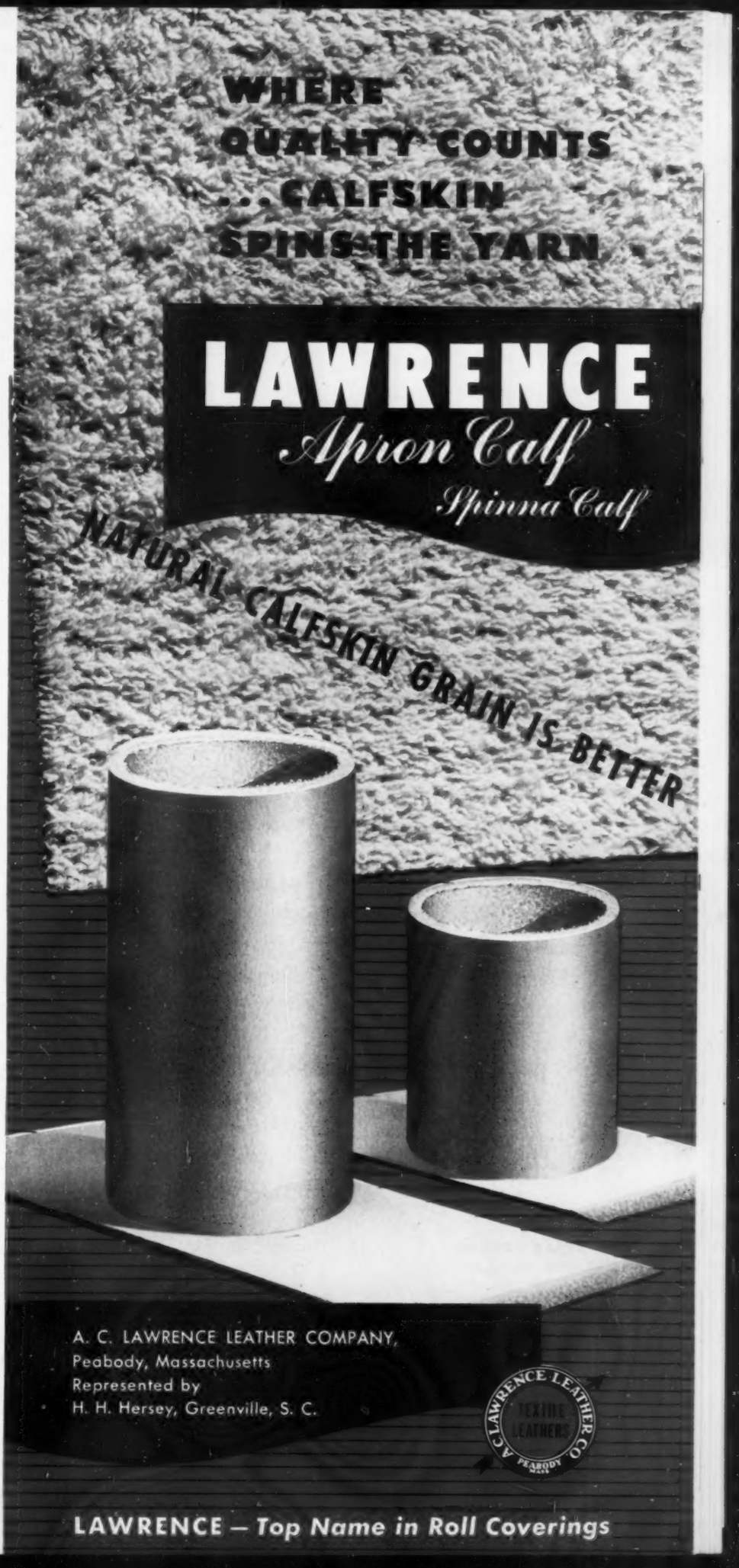
Ladies' Sweaters. A great change shook the industry when the idea of knitting fancy sweaters was first applied to women's apparel in the opening years of the century. Once introduced, the ladies' sweater became so popular that it provided a great stimulus to production in the knitted outerwear industry. Generally, the women's sweater was constructed in the same style as the modern golf coat. Some of them, however, were of the slipover variety, being open or buttoned along the shoulder. The knits were mostly fancy.

By 1910 the sweater reached a height of unprecedented popularity. Indeed, it might be said that the shaker sweater lent the real impetus to large scale production in the industry.

Bathing Suits. One of the greatest changes affecting any article in the knitted outerwear industry occurred in the design and manufacture of bathing suits. In the early stages of the industry, men's suits were of a sort that appear quite ludicrous to us today. We are merely enjoying the laughter of the "next" generation. But in days of 1890 the dandies disported themselves in the surf clad in trunks which terminated not much above their ankles, and a shirt which not only buttoned up to the neck but had quarter sleeves.

The type of knitted fabric used was so unfortunate as to allow for such an absorption of water that the suit was uncomfortably heavy when the swimmer trudged out of the water.

Before 1890, flannel was the material chiefly used in women's bathing suits, and the designs were of the utmost simplicity. In 1896 mohair was introduced for use in women's suits, and gradually it replaced flannel and hickory stripes for men's suits, although these two fabrics were still sold. In the early years of the new cen-



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tury, the use of mohair, taffeta, and other lightweight fabrics ushered in an era of changing styles to correspond in some degree with the prevailing styles in street garments.

It was a great victory of fashion over utility when the predominating features of the dashing swimming suit came to be the narrow waist and the huge puffed sleeves.

By 1907 the use of jersey was sufficiently widespread to lead bathing suit manufacturers to devote plants to such production. Knitted tights supplanted the old cumbersome bloomer. At first the knitted suit was used as an undergarment. But the predilection toward entirely knitted suits grew stronger. By 1910 there was an appreciable demand for the one piece bathing suit with the attached skirt. This style has enjoyed popular election by men and women since then.

Industry Growth, World War I. It was during the years of the First World War that the knitted outerwear industry saw its greatest growth. With the need of slipover sweaters and wristlests for the "doughboys," knitwear became more popular than ever and, at the close of the war, particularly with the increased interest displayed everywhere throughout the country in outdoor sports, was found to have achieved an accepted place in the nation's wardrobe.

The importance of the industry was given recognition by the government through the War Industries Board; and it was early in 1918 that the leaders of the industry banded together to form a federation of their various local trade associations that would be national in scope and would provide a medium through which knitted outerwear men in all parts of the country could cooperate with the War Industries Board. Thus came into existence the National Knitted Outerwear Association, which this year celebrated its 30th Anniversary at its annual convention in New York City.

Size of Industry Today. The number of knitted outerwear mills in existence today total over 700. If in addition we number as members of the industry those firms

which purchase yarn and have goods made to their order, the total of firms in the industry is over 1,000—greater than the case of either hosiery or underwear, even though the volume of sales and the number of employees are not as great. They represent a wide diversity of types, ranging from small contractor shops to firms as large and as well known as the Jantzen Knitting Mills and the Catalina Knitting Mills.

They produce a wide diversity of products which include varied types of sweaters for men, women, boys and girls and children and infants; knitted polo shirts, sweatshirts, and other types of knitted shirts for these same age and sex groups; bathing suits and swim trunks made of both knitted and woven material; knitted infants' outerwear, other than sweaters, such as sacques, bootees, combination sets, leggings, soakers, afghans, and other coverings; knitted headwear; knitted dresses and suits; a variety of knitted novelties such as neckties, shawls, scarfs, bed-jackets, footwarmers; and knitted accessories such as anklets and wristlets.

Sweaters Chief Item. Sweaters are the industry's chief item of manufacture, accounting for about 52 per cent of the industry's unit volume in 1946. Next in importance are knitted polo and sweat shirts which represented 25 per cent of the industry's volume in 1946. Production of knitted headwear stands third, followed closely by bathing suits and swim trunks.

In 1946, knitted headwear and bathing suits and swim trunks accounted for 9.7 and 9.0 per cent, respectively, of the industry's unit volume. All other knitted items produced in the industry represented the balance, or 3 per cent, of the industry's unit output in 1946.

Of the total production of sweaters in 1946, women's sweaters represented 35 per cent of the unit volume, men's sweaters 26 per cent, children's and infants' sweaters 25 per cent, and boys and girls sweaters 14 per cent. Of the aggregate unit volume of polo, sweat, and other knitted shirts produced in 1946, men's items ac-

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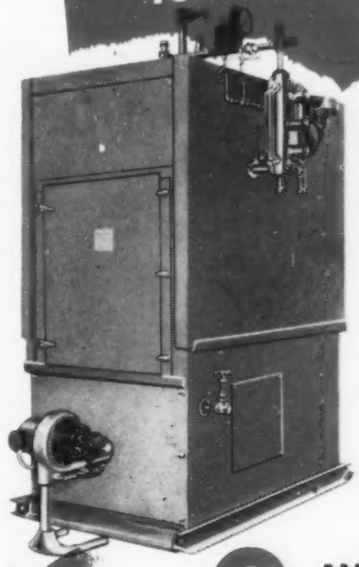

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counted for 34 per cent, women's 9 per cent, boys' and girls' 20 per cent, and children's and infants' 36 per cent.

The breakdown of the total volume of bathing suits and swim trunks manufactured in 1946 shows men's trunks, made of both woven and knitted fabrics, accounted for 44 per cent of the unit volume; women's bathing suits, both woven and knitted, 27 per cent, excluding 99,000 dozen suits made by women's apparel manufacturers; boys' knitted suits and trunks, 7 per cent; girls' bathing suits, both woven and knitted, 9 per cent; and children's knitted suits, 10 per cent.

Customer for Yarn Mills. Yarn is the basic raw material of the knitted outerwear industry. In 1946 the industry consumed 85,200,000 pounds of yarn of all types, and 12,800,000 pounds of purchased knitted fabric. Of the total amount of yarn consumed in the industry in 1946, 61% consisted of all wool, 27% of all cotton, 3% of rayon, and 6% were of all other types of yarns other than the principal fibers.

Types of Establishments. There are four types of establishments in the knitted outerwear industry —the regular mill, the contractor or contractor mill, the contractor-employer or jobber, and the knit goods specialty wholesaler.

The regular mill may be defined as an establishment which, using its own knitting, sewing, and finishing equipment, and utilizing its own yarn and other materials, manufactures any or all of the products of the industry for sale to either wholesalers or retailers.

A contract mill is one which produces knitted outerwear in its own plant but with yarns and other materials owned by and consigned to it by a contractor-employer to whose order the goods are made.

A contractor-employer is one who does not perform productive factory operations, but employs contractors to manufacture goods for him, supplying the contractor with the necessary raw materials—yarns, sewing thread, buttons, etc.

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Extra service...

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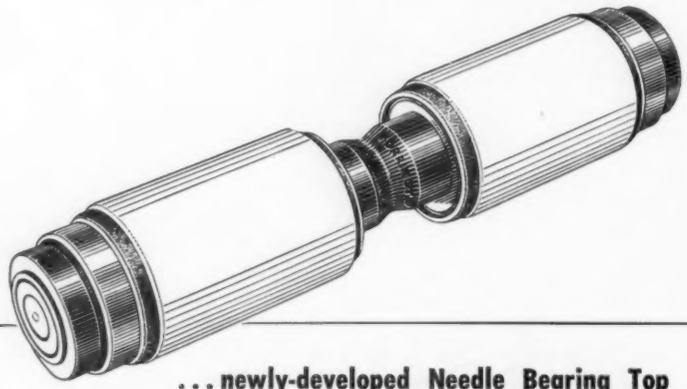
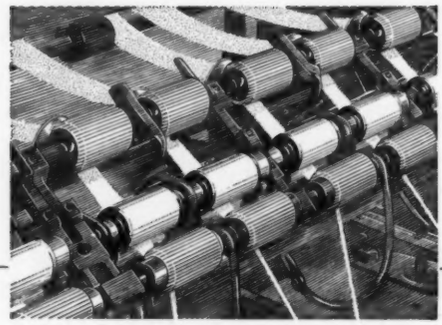


. . . newly-developed Needle Bearing Top Rolls improve quality, increase efficiency and result in economy of operation.

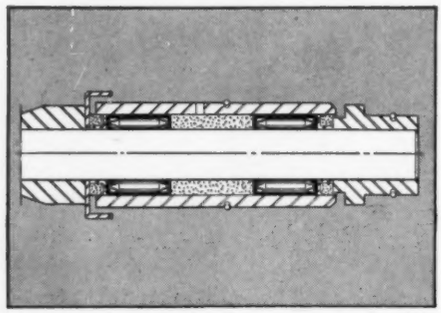


Less time out for piecing-up can be expected as one result of the smooth anti-friction operation of Torrington Middle Top Rolls equipped with Needle Bearings.

NEW TORRINGTON NEEDLE BEARING TOP ROLLS have been adopted as standard equipment in the middle row of the Saco-Lowell Shaw Controlled Draft System for roving and spinning frames.

Among the outstanding advantages of these New Needle Bearing Top Rolls are: longer service life assured by the high radial load capacity of the compact anti-friction Needle Bearings; bearing size permits use of large arbor for freedom from deflection; large oil reservoir insures efficient lubrication for long periods; design prevents oil leakage and accumulation of fly or lint between arbor and shell.

Torrington Needle Bearings lend themselves readily to compact design and easy fabrication and assembly. They have been time-tested in spinning, weaving, finishing, knitting and many other machinery applications. The anti-friction ease of operation reduces power input and produces better quality in the finished material. The specialized experience of Torrington's engineers is offered to help you adapt these low-cost anti-friction bearings to *your* machinery.



Cross-section shows ready adaptability of Needle Bearings to compact design. Use of two precision bearings per boss eliminates "rock," contributing to uniform quality of roving or yarn.

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Location of Industry. The knitted outerwear industry is distributed in 27 states with the chief centers of production located in New York City, Philadelphia, Boston, Chicago, Cleveland, Milwaukee, and Los Angeles. The largest number of mills are in the New York area, but most of these mills are small units.

A tabulation of knitted outerwear mill listings shows knitted outerwear plants located in the following states: Alabama, California, Colorado, Connecticut, Illinois, Iowa, Maine, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, Tennessee, Texas, Utah, Virginia, Washington and Wisconsin.

The following table presents the difference in the distribution of shipments by area:

Area	Per Cent of Total Shipments 1946
United States Total	100.0
New York	54.7
Pennsylvania	14.2
Middle West	11.2
New England	9.0
Far West	5.3
New Jersey	3.1
South	2.5

The knitted outerwear industry has a record of good financial stability as compared to the other ready-to-wear industries. An active demand for all types of knitted outerwear during the profitable war years helped many of the firms in the industry—especially the small regular and contractor mills—to achieve a great measure of financial stability. According to Dun & Bradstreet, there were only 8 failures of knit goods manufacturers during the five years from 1942 to 1946, with none since 1944.

Volume of Business. The following table shows the total volume of business done by the knitted outerwear industry from 1923 to 1946, excluding 1940 to 1945 for which years there are no figures available.

Year	Total Volume of Business
1923	$208,757,722.
1925	143,502,293.
1927	125,940,929.
1929	147,249,277.
1931	111,572,648.
1933	92,547,108.
1935	131,454,577.
1937	106,836,039.
1939	104,190,757.
1944	308,600,000.
1945	320,200,000.
1946	365,900,000.

These figures on dollar volume, however, do not tell the whole story, although in 1933 the dollar volume dropped to the lowest point in the foregoing record. It is significant to note that the unit volume of sweaters rose to an unprecedented high. Nearly 5 million dozen sweaters were turned out, more than in 1929 when production reached 4,800,000 sweaters, and far more than in any previous year. That so many sweaters should have been produced at a time when production in most other items had seriously been curtailed, is an indication of how well entrenched is the position of the sweater in the wardrobe of the average consumer, particularly where budgets are modest and some curtailment of purchasing is made necessary by the turn of business conditions.

The development of knitted outer apparel is still young and as even this brief review of the history of the industry will indicate, there is every reason to believe that the years ahead will see the industry's ingenuity lead the way toward a greater growth than has been witnessed even up to now.

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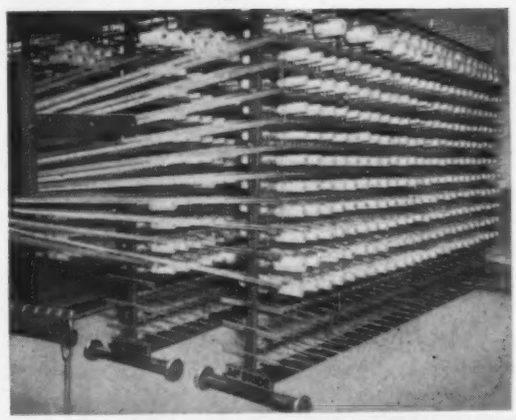

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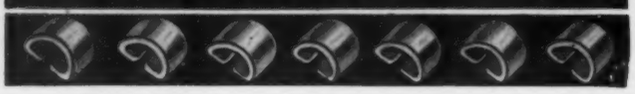

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50 Years of Progress in

Textile Auxiliary Equipment

By EIGHT WESTINGHOUSE ENGINEERS*

THE ADVANCES in textile manufacturing methods that have taken place since the turn of the present century are unquestionably as great, if not greater, than those made in all previous unrecorded and recorded history of the industry. This fact is especially significant when we realize that during the past fifty years relatively few fundamental changes have been made in the basic steps by which textile fibers are converted into cloth.

A considerable part of the recent progress of the textile industry has resulted from developments and improvements of equipments which may be described as textile auxiliaries. These auxiliaries are equipments which are not engaged directly in the handling of textile fibers but which make modern production possible or which increase quality or quantity of product, reduce cost, or improve conditions of manufacture.

A few of the auxiliary equipments that have contributed heavily to the advancement of the textile industry during the past five decades are: electric motors and controls, variable voltage direct-current motor drives, switchgear equipment, lighting equipment, capacitors, stokers, and electronic devices. The following paragraphs are devoted to tracing the developments of these equipments in the textile industry and, in some cases, predicting the trend we may expect to see in the future.

Electric Motors. History. Before the turn of the century a majority of the textile manufacturing plants were located on the banks of rivers and small streams from which they derived their power. Horizontal and vertical waterwheels drove line shafts and counter shafts throughout the plant through ropes or flat belts. The plants located away from rivers used steam for power. Here, ropes and flat belt drives were used to transmit the power throughout the plant from the Corliss engines.

As it turned out, water power, being vulnerable to seasonal changes, was not reliable enough to be a satisfactory means of power for a textile plant. Therefore, between the years 1890 and 1900 a number of large electric motors were installed to supplement the waterwheel. Fortunately, these motors performed satisfactorily, and from that point on the electric motor has been the prime mover of the textile industry.

Motors supplied at that time ranged in size from 100 hp to 1000 hp. They were designed for 2300-volt, 3-phase, 40- or 60-cycle electric service, and being large, were slow speed type.

Unfortunately, motor control development did not progress as rapidly as the design and development of electric motors. As a result, considerable trouble was experienced with the control for these original

NO STORY of textile progress would be complete without the parallel story of progress in auxiliary equipment. In one issue it is impossible to cover all such equipment and supplies, so the several items selected were electric motors and controls, variable voltage direct-current motor drives, switchgear equipment, lighting equipment, capacitors, stokers, and electronic devices. In addition to tracing the history and progress of this equipment as applied to textiles, the engineer-authors have given much valuable technical information. The story presented here indicates that progress in textiles is definitely interlocked with that of the electric industry.

*This article authored by eight Westinghouse Electric Corporation specialists: W. M. Emmons, P. C. Eppelsheimer, M. A. Land, J. G. Stephenson, B. D. Summers and W. W. Wildeman, Atlanta, Ga., F. D. Snyder, Boston, Mass., and A. T. Bacheler, East Pittsburgh, Pa.

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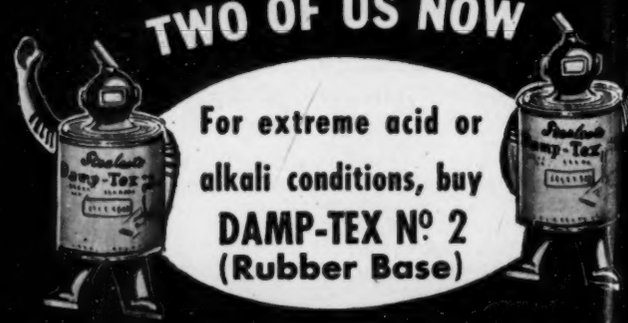

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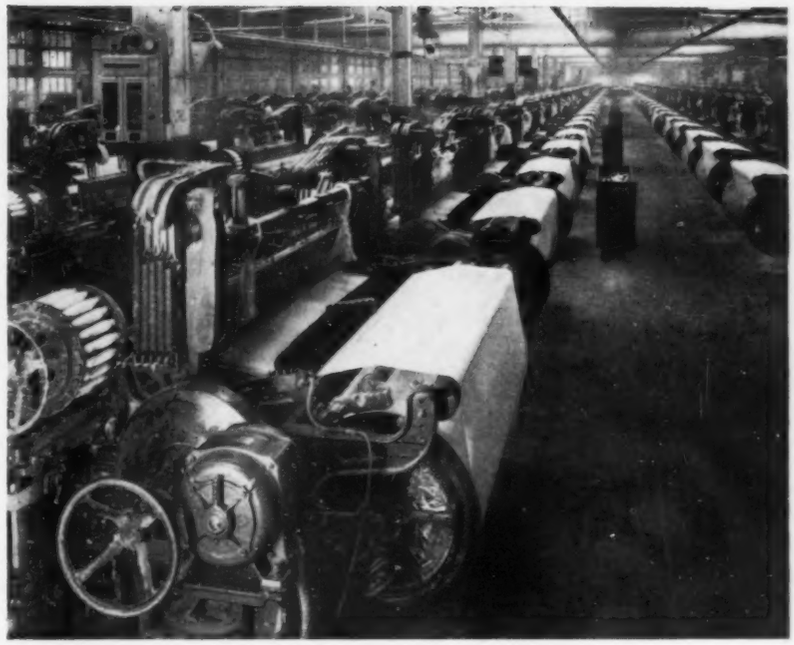
motors. One reasonably successful approach to the problem of reducing the starting current required was through the use of the wound secondary or slip ring type motors.

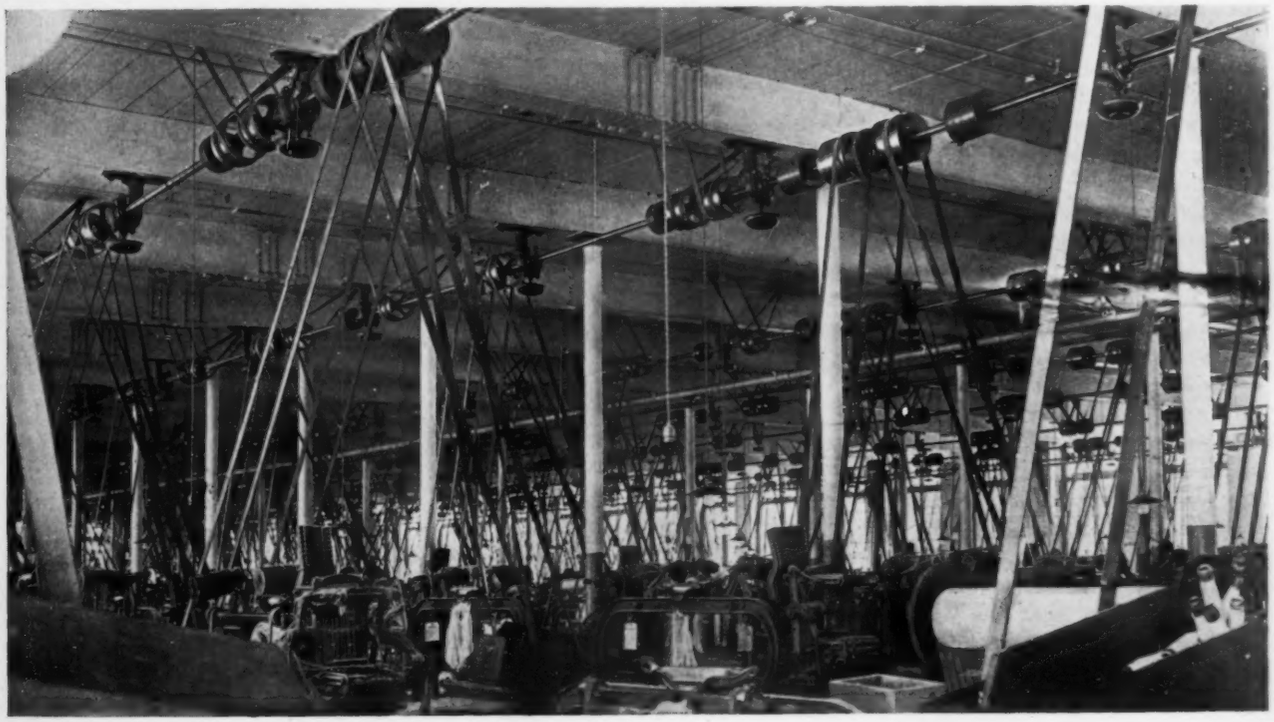
At the turn of the century, public utilities were expanding rapidly. Thus, electric power was made available to the textile industry. Simultaneously, the demand for textile products was increasing by leaps and bounds. As a result the textile manufacturing industry was also expanding and, wherever available, electric power was used.

Departmental Drives. A trend developed between the years 1903 and 1912 that has carried over to this day. Instead of installing one large motor to drive the entire mill, it was soon discovered that a separate motor for each department in the mill was much more economical. This type of installation went a long way toward showing mill management the real and fundamental advantages of electric motor drive. Inasmuch as textile mills are usually designed and built for balanced operation on one class of product, it is most desirable that the layout be flexible enough to permit overtime operation of the overloaded department in order to bring about an overall production balance. By equipping mills with a motor for each department it was possible to do this easily without the necessity of operating the entire line shaft system when the production of one department was required.



A modern weave room complete with an individual motor drive for each loom; flexible and rigid conduit wiring for lights and power; cool and efficient fluorescent lamps; and building of steel and concrete construction.

Typical weave room before introduction of fluorescent lighting. Note drop cord lighting.



Opening Rooms Took First Small Motors. From the year 1895 up through the year 1920 practically all of the mills being operated by private water-power stations or by steam engine drives installed direct-current 125-volt generators on their main line shafts to take care of their lighting requirements in and around the plant. Some of the steam driven mills had separate four-valve engine-driven direct-current generator sets for this service. Since the opening room of a cotton mill is an isolated department, it is difficult to tie it up with a satisfactory line shaft drive. Therefore, at the suggestion of the electrical machinery manufacturers representatives, the mills made their first small motor installations by placing direct-current motors in their opening rooms, power for these being supplied from the 125-volt direct-current lighting generators. These small d-c motors were also installed on isolated water pumps in and around the plants.

Around 1902, small a-c polyphase induction motors, ranging in size from 1 hp up, were being used throughout the textile industry with a fair degree of success. Among the many uses to which these a-c polyphase induction motors were put, was that of driving looms, pickers, and cards. Unfortunately, these early individual motor applications, with the exception of loom motors, were not successful as they did not stand up under the 80 per cent load factor requirements of textile machinery, due principally to the fact that the motor control available was not suitable for textile mill duty.

Ceiling-Mounted Motors. Following these early experiments, development of individual motor applications for the textile industry lay dormant for a period of approximately ten years. During that period the only notable advance in the application of motors in the textile industry was the adoption of the practice of mounting the motors in an inverted position on the ceiling of the various departments of the mill. Departmental electrification by single motor units continued through the year 1910, at which time the development of the ceiling-mounted two and four frame drive motor was started. Due to the moderate speeds at which spinning frames were operated, this development was principally on 10 hp, 4-pole, 1800 rpm motors for two frame drives and 20 hp, 4 pole, 1800 rpm motors for four frame drives.

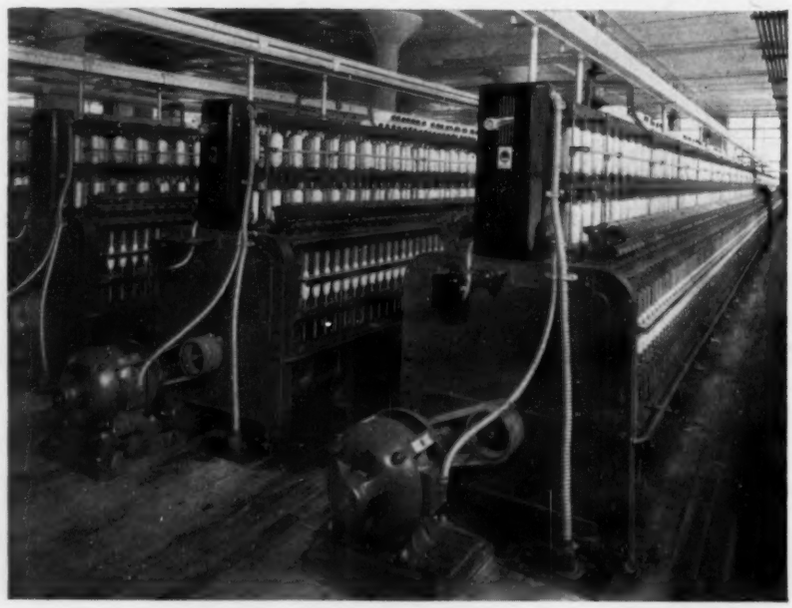
The years 1912 to 1914 saw the successful development of the individual loom motor applications, and individual drive was accepted as the proper method of driving looms by the principal loom manufacturers as well as the forward looking textile mill executives. It is appropriate at this point to state that for many years, and up to the present date, new looms have been and are now sold based on a calculated production and quality of product only when equipped with suitable individual motors and motor control.

Following the outbreak of war in 1914 the demand on the American textile industry doubled and tripled almost over-night, and speed-up programs were instituted in an effort to meet the abnormal requirements for cotton and woolen goods. It was soon discovered that the 10 and 20 hp motors applied to spinning frames would not stand up under the increased service. By 1916 it had been determined that spinning frame application required 15 hp, 6-pole, 1200 rpm motors for two frame drive and a 25 hp, 6-pole, 1200 rpm motor for a four frame drive. This development has remained standard up to the present time. However, motors of the same type have been developed in ratings up to and including 50 hp, 6-pole, 1200 rpm.

During this period, 1912 to 1916, the ceiling-mounted slow speed two and four frame drive 5 to 10 hp motors were successfully applied to slubbers, speeders, flyframes, and drawing. The double extended three-bearing 10 and 15 hp, 1800 rpm, two- and three-beater picker motors mounted on the A frame were developed and successfully applied. From the year 1916 to 1920, with but few exceptions, textile motor applications remained fixed as explained previously.

Immediately after World War I the exodus of the textile manufacturing industry from our New England states to the southeastern states started with a rush and continued at a fast pace through the year 1930. During this period the development of individual motor drives for textile machinery moved steadily forward. The first

Spinning frames equipped with individual lint-free motor drives.



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major development by Westinghouse at this time was the Class 815 and 816 across-the-line type oil immersed motor starters. These were designed for hand operation, or shipper rod operation, or pull chain operation with the starter mounted overhead. This was the first effective small motor starter ever developed.

First Individual Drive Mill—1923. In the year 1923, electrification of the Dixie Spinning Co., a 15,000-spindle fine yarn mill at Lupton City, Tennessee, was completed. Each machine in this plant was equipped with an individual motor and motor control. This was the first complete textile mill equipped throughout with individual motor drives. Each of the individual drives worked out successfully and they are still operating as originally laid out. This complete individual motor application was quickly followed by the installation of two 36,000-spindle units, including weaving and cloth rooms, at the plant of the Lincoln Mills of Alabama, Huntsville, Alabama. These two mill units are still operating successfully as originally laid out with the same electrical apparatus.

By 1925, the speeding up of looms was well on its way. One of the stumbling blocks, however, was the fact that the old design, housed-frame loom motors were showing distress and breaking down under the increased load demand. This brought about development in 1930 of a new loom motor that met the demand of looms that were called upon for increased production.

Variable Speed Spinning. From 1926 to 1930 complete and thorough tests were conducted with variable speed spinning. The results obtained indicated that as long as the top speeds were controlled and limited by the traveler, such as is used in ring spinning, it would be impossible to capitalize the overall expense of applying individual slip ring motors with commutator type rheostats to the cotton spinning frames so as to obtain satisfactory variable speed operations from the frame. Since that time there have been no large installations of individual variable speed motors for variable speed operation on cotton spinning frames.

The magnetic contactor type linestarter was placed on the market in 1924. Since then, the quality and design of linestarters for small motor application has continually improved. With this improvement the individual motor on textile machinery became more generally usable. It took the development of the across-the-line type magnetic linestarter to make the Class 815 and 816 oil immersed motor starters obsolete. The presence of inflammable oil in the earlier starters was too much of a hazard for them to continue to live through.

Lint-Free Motor. From the year 1920 through the year 1929 the individual screened type motor with waste packed bearings was the standard for individual textile machinery applications. The screen type motor was accepted but was never popular in the cotton textile industry because of the time required for cleaning of screens. In the year 1939 the first successful lint-free motor was produced for the textile industry. This motor, equipped with prelubricated ball bearings, was accepted immediately by the textile industry, and it is still the preferred motor by textile machinery manufacturers as well as the mill owners for applications in every department where its rating will permit it to be used.

Variable Voltage D-C Motor Drives. One of the outstanding developments in the history and progress of the textile industry was the adoption of individual motor drives for textile machines. The first large installation of note was made in the year 1902. When this first application of individual motor drives was made, wound rotor motors were used. As further progress continued these wound rotor motors were replaced by squirrel cage motors. This practice —of replacing less efficient drives with more efficient drives—has continued since its inception with attendant benefits to the textile manufacturer.

Many textile machines must operate at varying speeds in order to process the wide range in weight and grade of material being made. Some of these have been driven by variable speed wound rotor

Size rolls of multi-motor driven slasher showing compactness of gearmotor drive and control station. Production speed is set at master control station.

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motors; some by squirrel cage motors operating through mechanical speed changers. Both methods are at best inefficient when operating at reduced speeds, and in many other ways are undesirable.

Variable Voltage D-C Motors. The most recent and modern method for driving machines at reduced speeds is with direct-current motors operating from variable voltage generating systems. Such a scheme of operating d-c motors to secure varying speeds is not new as it has been widely used in such industries as steel and paper. It is only within recent years, however, that such a method of operation became acceptable to the textile industry.

There are many textile machines that can advantageously use variable-voltage direct-current motors and control. Among these are: water mangles, tenter frames, Sanforizers, warpers, slashers, dye ranges, and bleaching ranges. There are undoubtedly many others, but of those that can be mentioned, three that are undoubtedly ideally suited to this form of drive are: slashers, dye ranges, and bleaching ranges.

This 1000-kva unit substation supplies low voltage power throughout the mill. A 3-phase, 60-cycle 6600/550 volt, air cooled transformer is housed in the cubicle to the left of the column. A 550-volt drawout switchgear is housed in the metal cubicle to the right of the column. A 550-volt bus throat connection is used between transformer and switchgear.

Slasher Drives. The first progressive step in the operation of slashers was to provide a single variable-speed motor operating from a variable-voltage direct-current generator. This method eliminated the need for high speed, low speed, loose pulleys, and mechanical speed changers. All of the functions obtainable through use of these were easily obtainable in a single direct-current motor by proper adjustment of generator volts. However, the previous conditions existed as to stretch control and loom beam tension.

The most recent improvement in slasher operations in several years has been the development and application of the sectionalized slasher drive. This drive consists of a variable-speed direct-current motor driving each section of the slasher, with all section motors being powered by a variable-voltage direct-current generator. Uniform and controlled tension is provided between all sections, and regulated tension is provided in the winding of the loom beam warp. This regulated tension is obtained by electrical means which eliminate all uneven and jerky motions. It eliminates weak places in the yarn and reduces yarn breakage. It assures uniform diameter and compactness of the beam, and consequently eliminates slippage and otherwise reduces to a minimum the number of loom stops.

Dye Range Drives. The modern electric drive for a dye range would consist of an individual direct-current motor for each driven roll. All motors, except the folder motor, would be gear type motors having shaft speeds suitable for direct coupling to the driven roll. The maximum output speed of the section motor would be selected to correspond to the maximum dyeing speed ever expected. Each motor in the range would be powered from a single variable-voltage direct-current generator, and different dyeing speeds would be obtained by varying the voltage applied to the section motor armatures. Such an arrangement permits dyeing a wide range of weights of cloth with the same equipment.

Bleaching. Bleaching, like dyeing, was once a very slow process when compared to modern methods. The operation was done in stages and required handling of the material several times before the operation was completed. The material was first run through washers, then through suitable bleaching agents, and finally started in kiers where steaming took place. Suitable numbers of kiers consumed valuable space, which has become even more valuable under present high cost conditions. This process is in wide use today but is being replaced gradually by modern continuous bleaching processes.

A modern continuous two-stage bleaching range consists of a washer, a washer squeeze roll, a caustic saturator and a J-box in the first stage. The second stage usually consists of the same sections with a peroxide saturator being substituted for the caustic saturator. A third washer and squeeze roll follow the second

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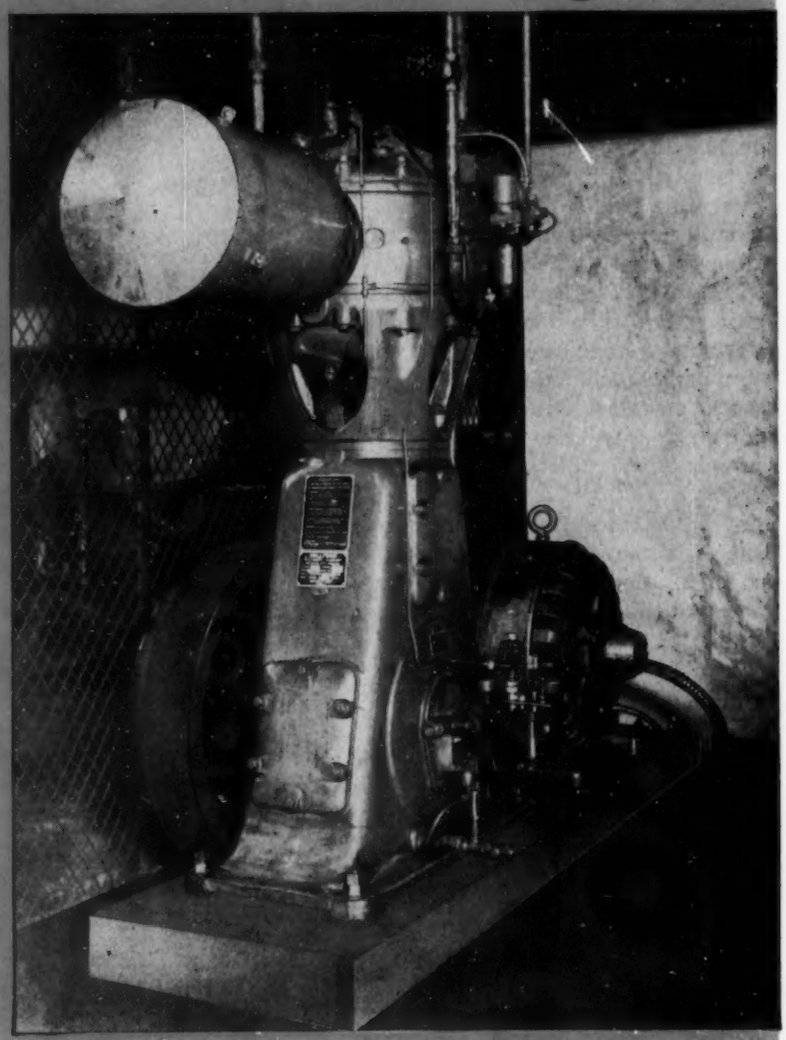

Because of its smooth running characteristics and the small base area of the rugged semi-steel frame, only a small block-type foundation is needed, making the Joy WG-9 an ideal installation where space is at a premium. Yet, despite this small space requirement, the WG-9 is built for heavy duty, continuous, 24 hour a day service, and incorporates such features as full force-feed lubrication, anti-friction main bearings and long-life "Dual Cushion" valves.

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J-box, after which the cloth is usually stored in white bins.

All sections listed for this modern bleaching range are driven by individual direct-current motors operating in range to give a continuous process. The motors are, of course, powered by variable-voltage generators. Usually, in order to obtain maximum flexibility, all motors up to and including the first J-box are powered by one generator. Those motors through the second J-box are powered by a second generator, while the remaining motors are powered by a third generator. With such an arrangement of motors and generators it is possible to run one weight of cloth through the first stage of bleaching at the required speed while a different weight of cloth is being taken through the second stage at a different speed. The speed of processing depends on the weight of goods and the time required in the J-box in order to obtain proper bleach. Heavyweight goods are run at slower speeds than lightweight goods, which may run up to as much as 200 yards per minute.

All motors in a continuous bleaching range must operate at speeds that cause the driven rolls to operate at the same linear speed. Overall speed changes are effected through changes in the generator or applied armature volts, while draw adjustments between individual sections are effected through changes in field excitation of section motors. These methods of operation are simple and require a minimum amount of supervision from machine tenders. Threading speeds, as well as different production speeds, are obtained by reducing the generator

World War I lighting practice in textile mills. Lamps were enclosed in a metallic reflector to reduce direct glare, and they were mounted at least 10 feet above the floor to more uniformly distribute the light, thereby softening the shadows.

Modern lighting practice for textile mills. Two-lamp 40-watt fluorescent units, mounted four per 25-foot bay, produce an average maintenance intensity of 30 foot candles in roving machinery room. The fixtures are mounted 12' 6" above the floor.

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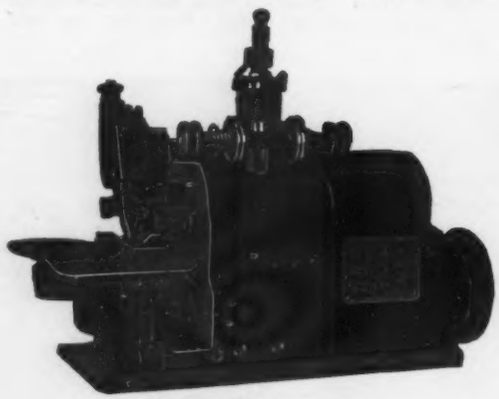
HIGH SPEED OVEREDGING, OVERSEAMING AND HEMMING MACHINES

FOR USE ON

Knitted and Woven Wear of All Kinds



QUALITY RESULTS
HIGH PRODUCTION
CONVENIENT HANDLING
MINIMUM TIME-OUT FOR ADJUSTMENT OR REPAIR
LOW UPKEEP COSTS

For Best Results Use a Machine Suitably Arranged for Your Work

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—Distributors—

HOLLISTER-MORELAND CO., P. O. BOX 721, SPARTANBURG, S. C.

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more economical to use . . .

because it runs more efficiently, producing a finer quality product that can be sold easier and more profitably.

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Lighting as practiced at the turn of the century. Bare lamps were suspended from the ceiling on drop cords. Note harsh shadows and direct glare that make seeing difficult.

volts to the proper value. After having been threaded the machine is accelerated to production speed by raising the generator volts to the proper value.

Switchgear Equipment. Until a few years ago, switchboards installed in textile mills were of the open type with exposed breakers, busses, disconnects, et cetera, and presented a real hazard to operating and maintenance personnel. The breakers were usually of the oil type with associated fire and explosion hazard and inherently difficult and expensive to maintain and service. Interrupting capacity was a term practically unknown, consequently was overlooked, with the result that few installations were made with breakers having adequate interrupting capacity. Protective features for the equipment and circuits were inadequate and unreliable. Continuity of service was looked upon as a goal impossible to reach.

As switchgear is the heart of the electrical distribution system of a textile mill, it should incorporate all the desirable features and advantages of safety, protection, flexibility, interrupting capacity, ease of operation and maintenance, and continuity of service. Modern switchgear has these features.

Modern switchgear for textile mills is of the totally enclosed, dead front construction, incorporating the maximum in safety and interlocking features. Drawout air circuit breakers are usually used as these employ a modern method of effective and fast arc interruption. The breakers have ample interrupting capacity to successfully handle the short circuit currents that can result from a fault on the system. They are of the removable drawout type, insuring complete safety, ease of inspection and adjustment, and ease and speed of replacement.

The breakers may be closed or tripped without opening any doors or exposing any live parts. Each breaker is totally enclosed in its compartment, and the compartment door is interlocked with the breaker to prevent opening the door while the breaker is closed in the connected position. Cell interlocks are also provided that automatically trip the circuit breaker if an attempt is made to move the removable element into or out of the "connected" position while the circuit breaker is closed. The interlocks and positioning devices assure safe removal and replacement.

Quick servicing of the breaker is provided by the drawout fea-

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THE ILLUMINATED MAGNIFIER
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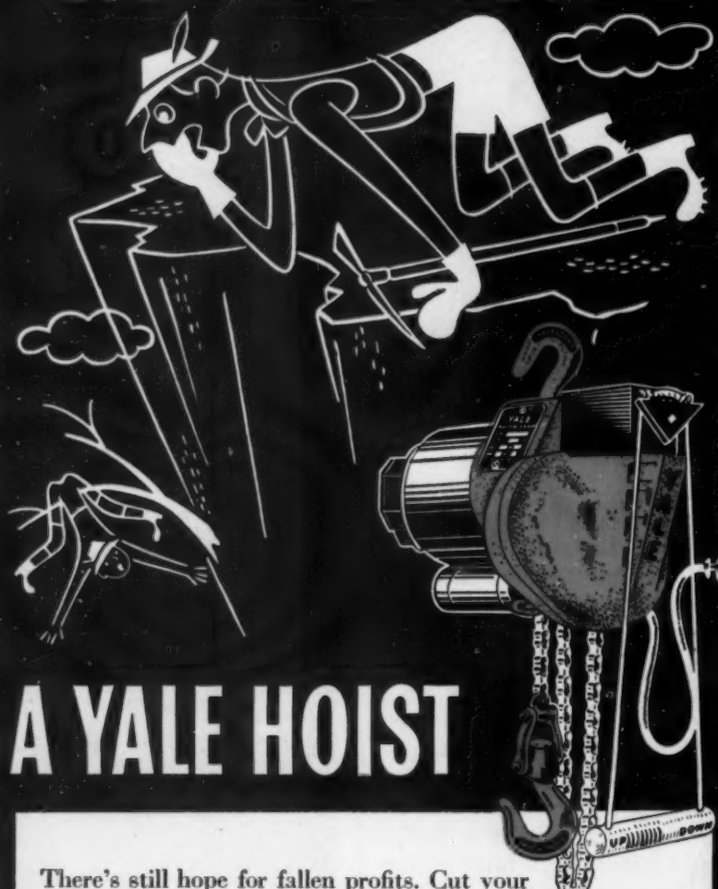


A YALE HOIST

There's still hope for fallen profits. Cut your handling costs . . . with a Yale Midget King Electric Hoist.

It can lift tons of material for only a few pennies a day, easier, faster, safer than when muscle power does the job. Consult your local telephone directory for the Yale mill supply distributor nearest you or, send for Catalog MK-T. The Yale & Towne Mfg. Co., 4665 Tacony Street, Philadelphia 24, Pa.

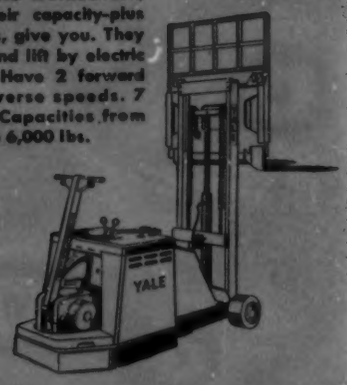
TOOLS THAT KEEP INDUSTRY "ON THE MOVE"

YALE

SCALES
HAND AND ELECTRIC HOISTS
HAND LIFT AND ELECTRIC TRUCKS

"ON THE MOVE" WITH YALE

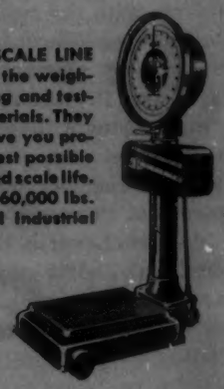
2 DAYS WORK WITHOUT A RECHARGE—That's the kind of performance the new Yale Worksavers, with their capacity-plus batteries, give you. They travel and lift by electric power. Have 2 forward and reverse speeds. 7 styles. Capacities from 1,000 to 6,000 lbs.



THIS "WORK HORSE" NEVER GETS TIRED—Lifting and toting loads up to 60,000 lbs., this powerful Yale Electric keeps production "on the move," saving time and money every hour it's in operation. There's a type and size to meet your specific handling needs.

HANDLING MORE MATERIAL with less effort is routine for Yale Hand Lift Trucks. Wide range of models. Single and multiple stroke; mechanical and hydraulic lifts. Capacities from 1,000 to 20,000 lbs.

YALE OFFERS NEW SCALE LINE—The Load Kings, for the weighing, counting, batching and testing of all kinds of materials. They cut weighing time, give you prolonged accuracy, lowest possible maintenance, increased scale life. With capacities up to 60,000 lbs. Yale Scales meet all industrial needs.



ture with rollers on the side engaging rails in the cell, and with the extended rails employed to roll the breaker clear of the cell. Each removable element and cell is jig assembled to insure complete interchangeability of units of the same type and rating.

The modern universal frame construction for low voltage switchgear provides flexibility and adaptability for present and future use. This construction makes it possible to locate busses in any desired position, and re-arrangement of busses can be made easily in the field if changes in loads make this necessary. The structure is so designed that any future addition may readily be made at either end at any time.

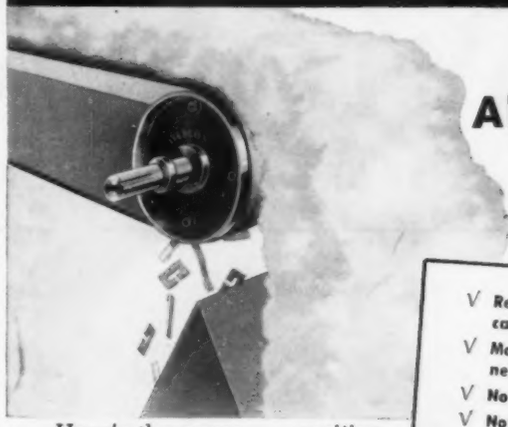
Excellent protection is afforded by means of dual overload series trip coils having inverse-time-limit characteristics for overload protection supplemented by instantaneous magnetic trip for short circuit protection. The latter, with the rapid arc interruption feature in the breaker, results in faults being cleared within a very short time, thus minimizing the disturbance to the system, and with little burning of the breaker contacts.

Continuity of service is the rule rather than the exception. By means of a spare breaker, any feeder breaker can be quickly and safely replaced with the spare, and service on that circuit can be restored with minimum interruption time and no interruption of service on the other feeders. Ordinarily a breaker is replaced for inspection and adjustment and not because of trouble; therefore, the time usually can be selected for this purpose, when a short interruption of service is permissible.

The switchgear is factory assembled, wired, and tested, and is shipped in one or more sections so it can be easily and quickly installed. A majority of mills purchase power at the utilization voltage, the power company supplying the transformers. A radial system having one point of distribution at the utilization voltage is the accepted practice for such applications.

In the case of large mills having a large amount of power to distribute and over long distances,

New... Powerful... Non-Electric



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Alnico Magnet
PERMA-PULLEY

- V Removes Tramp Iron Automatically and Continuously
- V Most Powerful Permanent Magnetic Pulley Available
- V No Operating Cost
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Here's the easy . . . positive . . . automatic way to prevent cotton fires caused by tramp iron sparks. Dings new Perma-Pulleys are made of the highest grade Alnico . . . *magnetic permanence guaranteed for life of pulley!* Non-electric . . . no operating or maintenance expense. Advanced design. Available in belt widths from 12" to 60" and in special sizes. Any shaft diameter. Also complete pulley type separators with PERMA-PULLEY, idler pulley, belt and drive in any size required. Write for recommendations on best and most economical magnetic protection equipment.

Dings Offers the Most Powerful Pulleys for the Job!

FOR BURDEN DEPTHS UP TO 3 INCHES — the Dings Perma-Pulley with extremely high surface strength.

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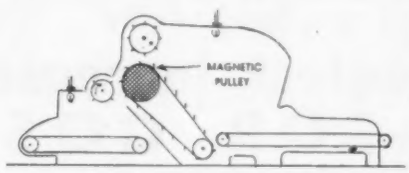
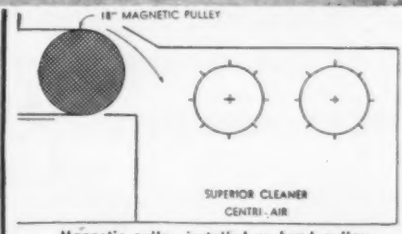
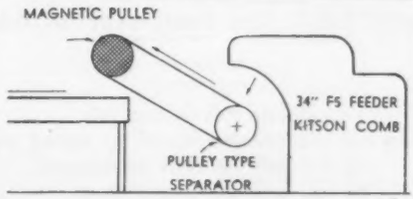


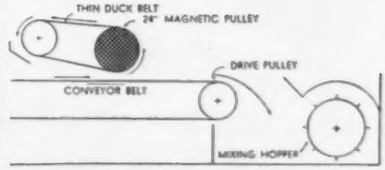
H & B Bale Breaker showing location of magnetic pulley on spike apron.



Magnetic pulley installed as head pulley on conveyor feeding cleaner. Discharge of iron is automatic.



Magnetic pulley type separator consisting of magnetic pulley, idler pulley, endless belt and accessories ahead of feeding table.



Magnetic pulley type separator installed above conveyor belt lifts iron out of cotton and discharges to side.

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4726 W. McGEOGH AVENUE, MILWAUKEE 14, WIS.

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"HIGH INTENSITY"

MAGNETIC PERMANENCE GUARANTEED FOR LIFE OF INSTALLATION

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Fine Cotton and Rayon Fabrics

Selling Agents—DEERING, MILLIKEN & CO., 240 Church Street, New York City

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has had the

Greatest Increase in LABOR COSTS

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It is now *imperative* that

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Doing this is our job.

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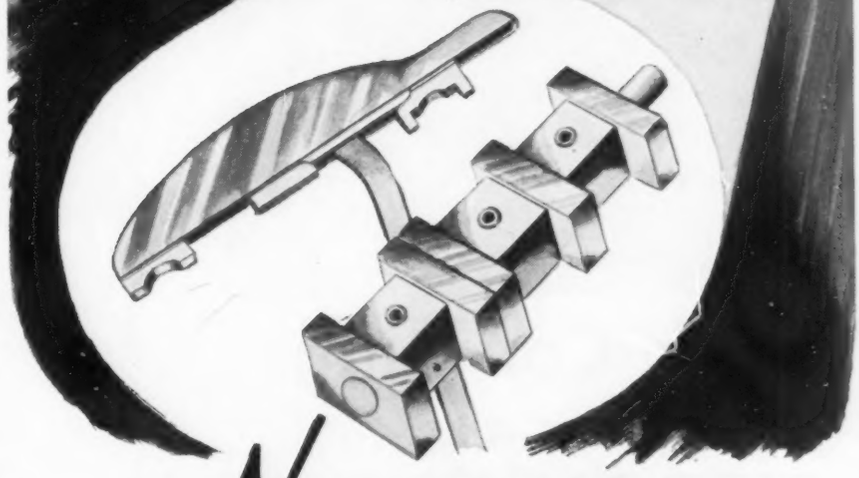
other forms of electrical distribution systems are gaining favor and are being used. This involves distributing the power over high voltage primary feeders such as 2300, 4160, 12,000, or 13,800 volts to concentrated load centers where it is stepped down to the utilization voltage and distributed over relatively short low voltage feeders to the motors. Power centers, a combination of a 3-phase transformer with primary facilities such as a breaker, disconnecting switch and/or fuses with low voltage metal-enclosed switchgear as described previously are installed at the load centers. These units are of smaller size, with resultant smaller breakers in ampere and interrupting ratings. Long feeders are eliminated, thus reducing the losses, the quantity of feeder cable, and improving the voltage regulation.

Dry type transformers with their many inherent advantages over liquid filled transformers are becoming popular for indoor installations. Many forms and schemes of primary distribution can be used with this system of distribution as developed and recommended by the American Institute of Electrical Engineers Committee on Industrial Power Applications, which has been published in bulletin form. Network systems, primary and secondary, may be used and provide the maximum protection and advantages from the standpoint of reliability, flexibility, future expansion, good voltage regulation, high quality and continuity of service, and minimum operating and maintenance expense. The possibilities for the network system of electrical power distribution in textile mills in the future are bright. With a look into the future we believe it will develop into the accepted and recognized standard.

Lighting. Nearly all mill operations were carried on during daylight hours at the turn of the century for the simple reason that suitable artificial illuminants were not available. With the introduction of the incandescent lamp around 1890 and the improvements that followed, electric lighting for textile mills did reach the con-

DIXON

Puts the Spotlight on



A *New* SADDLE AND CAP BAR*!

WITH *SLIXONICE** BEARINGS

The New Frictionless Bearing That NEVER Needs Lubrication.

YOU CAN NOW HAVE AN *OIL-FREE* DRAFTING UNIT WHICH WILL:

- REDUCE SPINNING COST
- ELMINATE YARN SOILING
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Send for our booklet, illustrated here, which gives detailed information on new Slixonice Saddles and Cap Bars.

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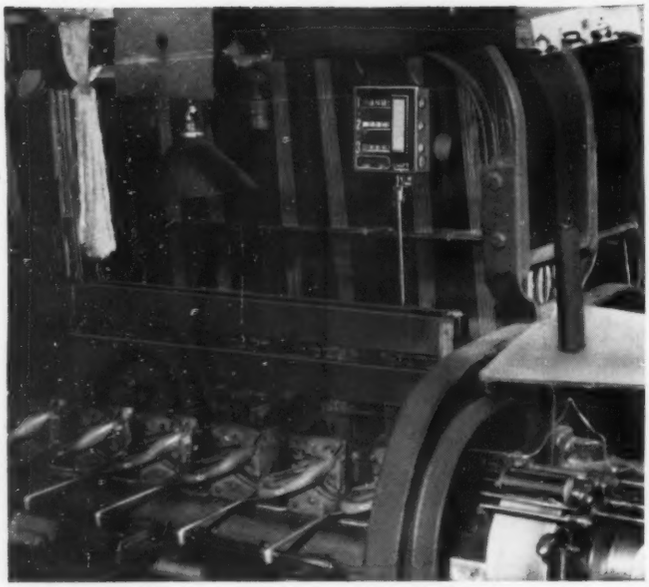
SLIXONICE SADDLE AND CAP BAR NEBS



Pick Counting *on a* RIBBON LOOM

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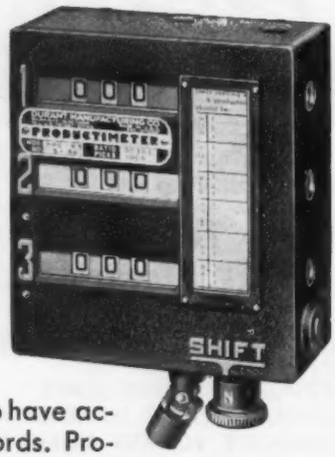
3-SHIFT PICK COUNTERS

Especially designed to meet the varied requirements of mill men . . . ruggedly built for long, continuous wear. Also available in 1-Shift and 2-Shift models.



Every mill man needs to have accurate production records. Productimeters meet every need in textile mills . . . eliminate losses . . . help maintain maximum production . . . and provide an accurate basis for wage payment.

Precision engineered and ruggedly built for long, continuous usage . . . there is a Productimeter for every application of counting in the textile industry.

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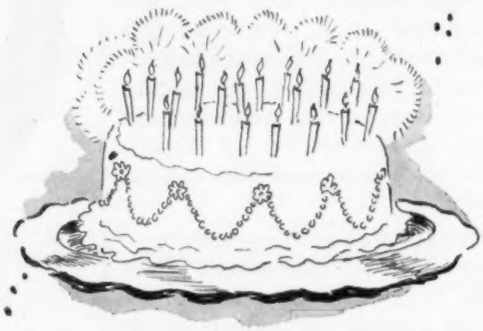

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Manufacturers of

- **Turkish and Huck Towels** (both plain and name woven)
- **Damask Table Tops and Napkins**
- **Toweling** • **Corded Napkins** • **Suitings**
- **Diapers** • **Flannelettes**

templative stage. Later on mercury vapor lamps, and ten years ago, fluorescent lamps, became available. These additional light sources materially aided the illuminating engineer in making possible around-the-clock operations of textile mills.

One of the earliest available references to lighting levels in the textile industry appeared in the Illuminating Engineering Society Transactions for 1911. In a paper presented to the Philadelphia Section of this Society on May 19, it was stated that "the following figures will give an approximate idea of the intensities used in present practice."

Process	Footcandles
Weaving	3-6
Spinning	1-4
Carding	1-3
Breaking	1-2
Warehouses and Storerooms	1-3

The fixtures in use at that time were usually clusters of five or six bare lamps "not exceeding 100 watts in capacity," under a diffusing reflector 26 or 40-inches in diameter.

While present day lighting practice calls for much higher intensities throughout the mill than the 1911 standards, these came about gradually. In fact, they have progressed logarithmically every decade since 1911. In that year for example, 3-6 footcandles of light was specified for weave room lighting. By 1922 this had increased to 5-10; by 1935 to 20 and by 1947 to 50-100.

Present day lighting practice, using newer and more efficient light sources, combined with improved fixture design, makes it economically feasible to use the following illumination levels in textile mill operations (Westinghouse Lighting Handbook—1947):

	Footcandles
Opening, picking, carding, drawing	10
Slubbing, roving, spinning, spooling	20
Grading	100
Warping on comb	30
Beaming and slashing on comb	
Grey Goods	50
Denims	100
Inspection—	
Grey Goods (hand turning)	50
Denims (rapidly moving)	200
Automatic tying-in, weaving	50
Drawing-in by hand	100

From the foregoing, it is ob-

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- Cationic surface-active softening agents.
- Insure permanent, distinctive, soft, lofty hands to rayon, acetate, Bemberg and cotton.
- Impart hands of excellent pliability to aralac, silk, wool and other textiles.
- Do not plaster nap down. Leave a soft, fine nap on nubby or rough goods, without matting.
- Substantive to textile fibers.
- Easy to apply in print washer, jig, dye beck, quetsch or starch mangle.
- A little goes a long way.
- Stable to hard water, chlorides, sulfates, organic acids, and small amounts of mineral acids.
- Wide range of effects available.

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Lubrication is the Lifeblood of Twisting Spindles

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The WICACO SPINDLE OILING MACHINE GUARANTEES PROPER LUBRICATION!

IT flushes out the old oil and replaces it with fresh oil in one simple operation. It saves time, labor and power, and guarantees proper oil level at all times.

This machine is used successfully in many mills producing wool, cotton, silk and rayon.

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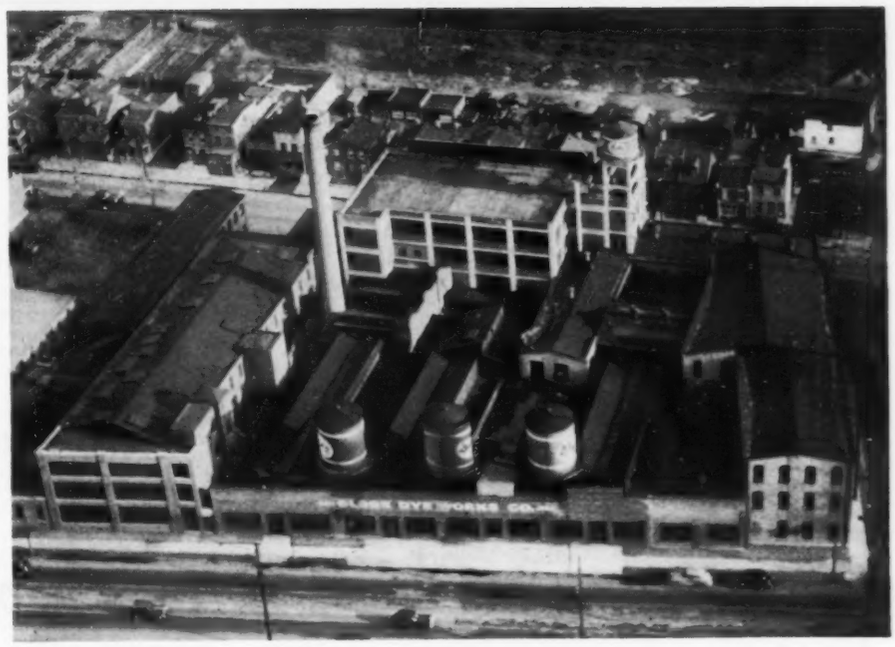
vious that lighting has more than kept pace with improvements in the textile manufacturing field. In fact, a good case can be made, that without the improvement in lighting facilities, the newer, higher-speed machinery in the textile industry could not have been used.

Capacitors. The use of capacitors in the textile industry has been a recent development, having taken place within the past ten years. It has been brought about by a combination of higher power demands and a general overloading of power systems. As a result, most power companies have offered incentive rates to mills that will improve their operating power factor. These rates have been very attractive, and in most cases the savings pay for the required investment in capacitors within two years.

Power factor becomes a problem in power supply as it represents the relation between the kilowatt load and the generator capacity required to supply that load. The lower the power factor the larger the generator capacity and size. Since most generators have a prime mover which can supply the full generator rating in kilowatts, it is desirable to operate as near 100 per cent power factor as possible to obtain maximum kilowatt output. This was the case during the war, and it still is the object of most industrial and central station generating plants.

Power factors of 100 per cent apply to resistance loads such as heaters or tungsten filament lamps. Power factors under 100 per cent are caused by the magnetizing or excitation current being taken from the line. Such current is required for devices that have iron magnetic circuits such as the induction motor. Induction motors may operate at power factors as low as 50 per cent for small ratings or as high as 93 per cent for larger ratings. These motors operate at decreasingly lower power factors when the load is less than full. Most motors have a no-load power factor in the order of 30 to 35 per cent.

Capacitors, when connected to a power system, provide the opposite of magnetizing current and, therefore, cancel its effect and im-



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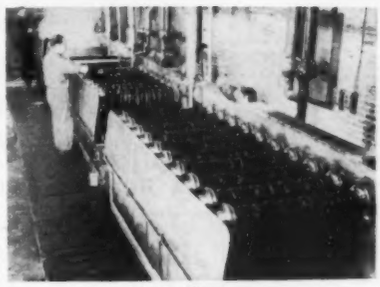
Package Dyeing



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Research and general laboratories

Since 1865, Globe Dye Works Company has been a leading commission dyer of yarns for every weaving and knitting purpose, giving efficient dyeing service to exacting customers locally and throughout the entire textile industry.

As the industry has grown, Globe has expanded its personnel and equipment, until today no plant anywhere has more to offer in quality, variety, and volume of yarn dyeing service.

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Yarns we process include cotton, rayon, worsted, nylon, blend and novelty yarns.

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We do package dyeing on tubes, skein and warp dyeing, warp mercerizing and sizing.

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FOR FORTY YEARS

Swift Spinning Mills, Inc., have consistently manufactured High Grade Yarns which have proven to be satisfactory for the knitting and weaving trade.

We assure our customers that no efforts will be spared to continue to be a reliable source of the

HIGHEST QUALITY OF CARDED YARNS

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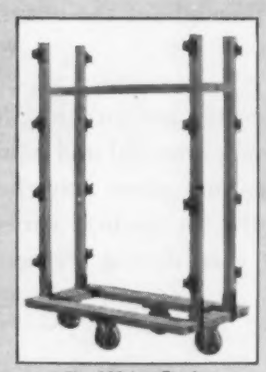

Fig. 310 Lap Truck

Nutting

MATERIAL HANDLING *Time Savers*

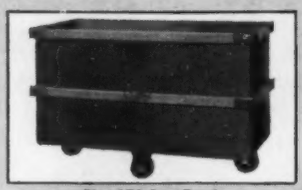

Fig. 870 Box Truck

Fig. 360 Baling Press Truck

Fig. 304-A Doffing Box Truck

Fig. 88-3XRF Caster With Thread Guard

Fig. R10HDW Rubber Tired Wheel

TEXTILE INDUSTRY TRUCKS AND CASTERS FOR EVERY PURPOSE

Your production program can be speeded up . . . and your handling costs reduced . . . by a properly engineered materials-handling system. Why use trucks that only approximate your needs when there's a Nutting for every purpose? More than 1,000 truck designs have been developed in the Nutting line to suit each type of work. Call in a Nutting sales engineer, and let him help you select the right equipment.

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NUTTING TRUCK AND CASTER COMPANY

2300 Division Street West, Faribault, Minnesota

our 57th Year

prove the load power factor. They consist essentially of layers of aluminum foil between insulating kraft paper. These are rolled, pressed flat, and assembled in containers which are then filled with a special insulating fluid and sealed. Terminals are provided in the form of bushings on the top of the capacitor. The final assembly may include an individual dust tight enclosure over these terminals, or several capacitors may be assembled in a common rack.

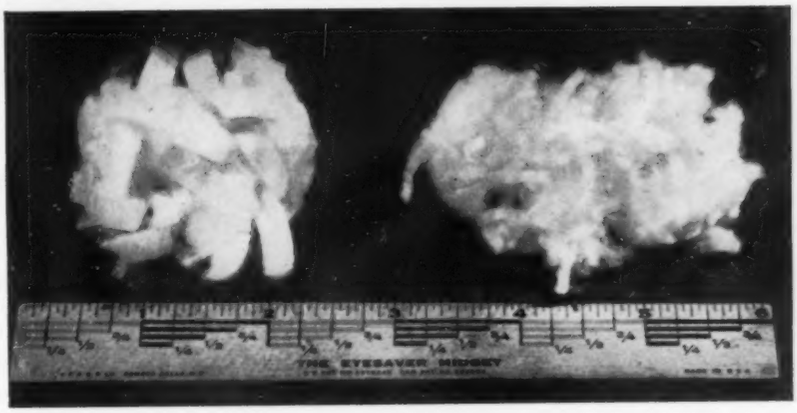
The power factor of an average textile plant will vary depending on the proportion of large to small motors. In older plants where large motors driving lineshafts predominate it will vary between 85 and 87 per cent. In the more modern mills, those using large numbers of individual drives, it will vary over a wider range, with 70 to 75 per cent being a good average. Mills having large numbers of individually driven looms will usually be at the lower values since these small motors may operate at as low as 50 per cent power factor.

Mills that purchase their power have in many instances installed capacitors at the suggestion of the power company. It is the practice of power companies to make checks of the total mill power factor and then advise the mill what savings will be made by the installation of capacitors as based on past billings. The usual value to which correction is made is approximately 90 per cent. Most power rates are, however, so set up that further savings will be made if correction is carried to 100 per cent. The return on the investment is at a diminishing rate beyond 90 per cent but still is quite attractive and is taken advantage of by many mills.

In making a capacitor installation it is possible to gain other advantages beyond power factor correction by distributing the required capacitors throughout the mill. Since capacitors correct for low power factor and reduce required current they should be located as near the load as possible. This reduces feeder current and losses along with less load and heating in contactors, switches, breakers, and transformers.

Capacitors may be tied to the

TAYLOR-STILES CUTTERS



Here are samples of nylon sliver cut to 1/4" lengths (left) and 1/16" lengths (right).

They Solve New Textile Cutting Problems

New trends in yarns bring their problems with them, one of which is finding cutters to meet the specialized needs of individual fiber types. In recent years—

TAYLOR - STILES TEXTILE CUTTERS

have been developed—

—To cut continuous fibers of rayon, nylon and other synthetics into staple lengths for spun rayon, and for blending with cotton, wool, silk, and other fibers.

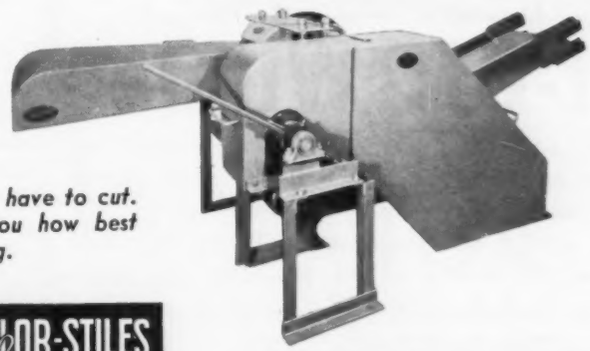
—To cut ramie and other natural fibers to uniform lengths for decorticating spinning into yarns and for blending with other fibers.

—To cut wool rags and garments into small pieces in the making of reworked woolen fabrics.

—To cut thread waste and other tangled fibers.

STAPLE CUTTER

As new textile cutting problems arise, Taylor-Stiles cutters will be available to solve them efficiently and economically.



Tell us what you have to cut. We will show you how best to do the cutting.

THREAD WASTE CUTTER

TAYLOR-STILES and Company
CUTTING MACHINES & KNIVES

BRIDGE ST. *Our 85th Year* **RIEGELSVILLE, N. J.**

A NEW HIGH SPEED CREEL

SIPP-EASTWOOD

Presents

A NEW HIGH SPEED CREEL

Big Concerns use this creel to run off sample lots of yarn, instead of banking a big creel.

Other Concerns use it as a production machine. Note these features and advantages.

1) Yarn is ballooned from the package.
2) Tensions are the same as on the largest creels, magazine creels.
3) Anything you put on a creel for over-end delivery, you can put on this small creel.
4) The only limit of speed is what the yarn will take.
5) Standard sizes are 150, 300, 450 spindles. For large cans, the standard size is 240 spindles, with additions of 120 spindles each.

ITS A TRADE MARK SIPP EASTWOOD

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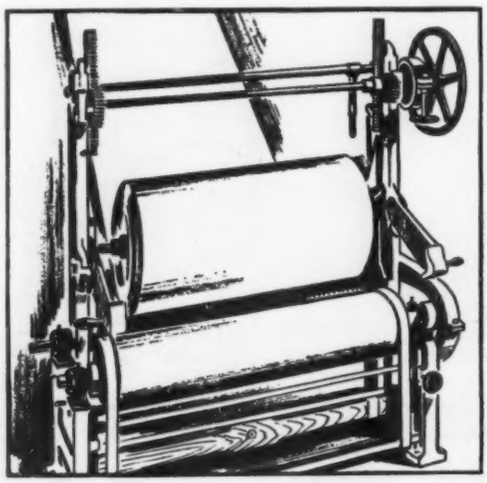

Cut-Off Winder

The improved Simpson Cut-Off Winder has pneumatic cut-off and automatic slitter. Saves refinishing up to 50 yards of cloth that normally is spoiled in completing one roll and beginning another. Saves heavy lifting. Saves time. Made in 50" and 60" widths, or special widths as desired.

H. W. BUTTERWORTH & SONS COMPANY
Serving the Textile Industry Since 1820
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IT'S TOO TOUGH FOR ME!

There's a lot of satisfaction, and peace of mind, too, in knowing your property is protected by a Stewart Chain Link Wire Fence. Stewart's famous All Beam fence framework construction is the heaviest and strongest manufactured . . . built to give the utmost in protection and many extra years of low cost service. Write for Catalog No. 83. It contains complete details.

THE STEWART IRON WORKS CO., INC., 1524 Stewart Block Cincinnati 1, Ohio *Experts in Metal Fabrications since 1886*

Stewart IRON and WIRE FENCES

terminals of larger motors, thus eliminating the necessity of a disconnecting switch and also assuring the capacitor being connected when the motor is running. The rating on this type of installation should not exceed ½ of the motor horsepower in KVA. Another common practice is to connect the capacitors to the load side of contactors starting groups of looms. On loom feeders it is common practice to add capacitor KVA equal to the motor connected hp since these are low power factor circuits. It is usually desirable to connect some capacitor groups direct to feeders. The recommended practice in that case is to use air circuit breakers for low voltage or oil circuit breakers for high voltage. Blade type switches have not proved satisfactory for this service as the blades tend to operate at a continual rising temperature on the continuous load with resulting frequent failures.

When capacitors are installed the total amount required is first decided upon. The distribution is then proportioned on the basis of the amount of load on the various circuits. Usually the heavily loaded and low power factor circuits such as spinning and weaving are favored with larger amounts. Special attention may also be given long circuits with low voltage as sometimes occurs with opening and picking rooms.

Most textile mills throughout the Southeast now use capacitors. Their use has given very satisfactory results since they have not only reduced power costs but have made possible better use of available distribution systems by increasing load carrying capacity and voltage conditions.

Stokers and Control Equipment. With the development and wide acceptance of the induction motor and the building of long distance, high voltage transmission lines for the transmission of economically produced electric power, a renaissance took place in the method of supplying power to textile mills. Electrification became the general rule, with individual machine drives and the purchase of power from outside sources. Water rights, which have been kept in effect

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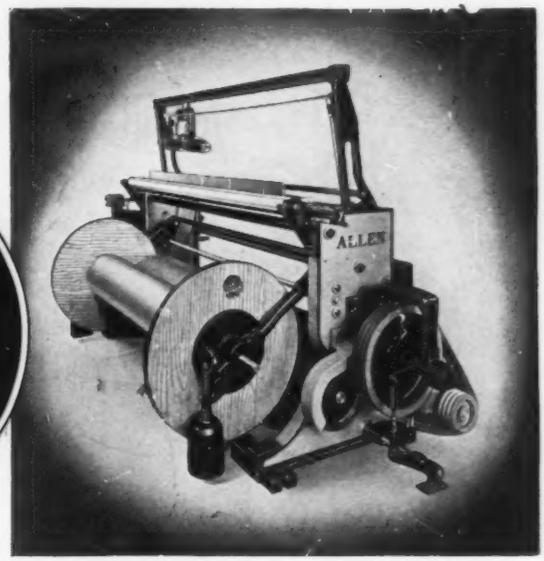
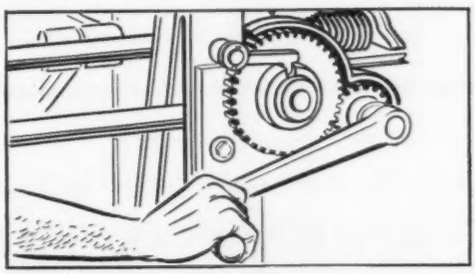
We make Warper Beams for Cotton and Synthetics • • • Also Loom Beams

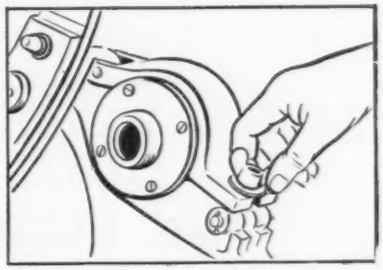
ALLEN Cotton Beam Warper



Model "C" Cotton Warper

See how it doffs in 30 seconds





10 SEC A few turns of beam doffer crank depresses ball bearing beam arm and lowers beam to floor.

20 SEC Releasing wing nut frees beam by permitting ball bearing to slip off shaft ends.

1. Speeds up to 700 yards per minute.
2. Electric stop motion.
3. Beam doffing device. (Shown above).
4. Automatic lint cleaner for preventing collection of lint in combs and yarn.
5. All adjustments made on outside of Warper.
6. Adaptable for use with any make of creel.
7. Efficient Braking device.
8. Motor and V-belt drive with silent chain and sprockets.
9. Ball bearings throughout.

Allen KXR Cotton Warper Beams balanced for speed and for running on all makes of Warpers to make a perfect Beam. Good Warps are made on good Beams.

★

Cotton and Rayon Beam Warpers

Ball Warping Machines

Narrow Fabric Warpers

Intermediate Dresser Stand for Woolen and Worsted Warp Yarns

Expansion Neck Reeds

All types of Expansion, Warper, Beamer and Slasher Combs

Replacement parts for Saco-Lowell and Entwistle Warpers

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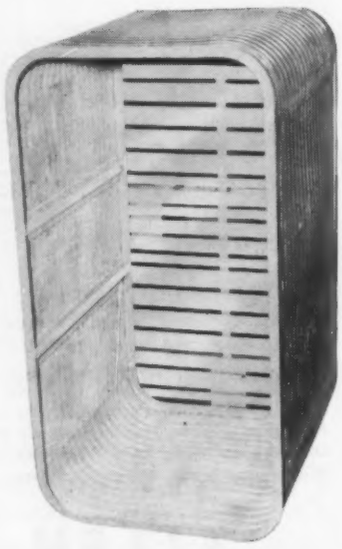
THE RIGHT TRUCK FOR THE RIGHT JOB



Practical experience, coupled with original ideas and constant improvement, assure you of a Paddock truck that fits your individual needs . . . saves time and money in your mill.

Paddock trucks are built for service and durability through skilled engineering and the best materials available. Trucks are made to your specifications for any department in your mill.

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J. C. PADDOCK COMPANY

Spartanburg, S. C.

since the last century, are still used extensively for generating electric power, generally to supplement that purchased. Few plants are self-sufficient in power requirements, and those plants generating their own power are usually tied in with outside sources. The majority purchase outside power in full or in part.

It naturally followed then that the power plant should become a branch of the textile plant rather than the nucleus. For that reason, in many mills today, it does not receive the attention it justly deserves, because its function has been reduced to heating and process. For many plants, in the seasons requiring no heating, the steam requirements are solely for slashing, which, because it is such a small part of the overall process, makes for neglect in the steam plant. There is a real need for more meters for operation and record, and better and more complete records. The need is increasing with rising fuel and labor costs. More complete equipment, better supervision, and more complete cost records on steam plant operation, to properly evaluate cost accounting on the finished product, and to justly fix the responsibility for abnormally high steam costs, is a coming necessity.

As the better seams of coal were worked near to exhaustion and the increase in the demand for coal required the opening of new seams of low grade bituminous varieties, the need for mechanical firing became more pronounced. Competition required the higher efficiency which was obtainable with stokers. Efficiencies of 84 per cent for combined boiler and stoker are readily obtained today with proper heat recovery equipment (economizers and air heaters), as compared to efficiencies rarely above 60 per cent with hand-firing.

Paralleling the electrification of the textile industry came the change from hand to mechanical firing. This change was brought about due to keener competition and the rise in fuel and labor costs, concurrent with engineering progress in stoker firing of coal. A hand fired boiler is now rarely seen in a textile mill.

The first stokers to make their

MATERIAL HANDLING News

Electric Fork Trucks and Gas Fork Trucks — CLARK BUILDS BOTH

It is as true in the field of materials handling as it is in the field of medicine that a completely objective and unbiased approach is essential to any search for facts.

In many installations gas-powered equipment does the best possible job; and Clark gas-powered machines do these "best possible" jobs in the best possible manner. Many gas-powered Clark machines remain in operation after 20 years of continuous service—ample proof of their sturdy excellence.

In many other installations it is clear that electric battery-powered machines will serve most efficiently and economically—and in these instances Clark sales engineers recommend Clark electrics.

Electric fork truck loads palletized cases of canned goods on trailers.

Clark undertook the manufacture of electric battery-powered fork trucks with a conviction that it could build a better machine than it could find on the market, and at a lower cost. Exclusive initial economies which Clark foresaw and achieved—and which it affords Clark users—resulted from Clark's mass production of both gas and electric machines as well as of most of their major components, and from its unparalleled pattern of parts interchangeability. These are basic advantages immediately apparent to seasoned production men.

Gas-powered carloader with HI-LO-STACK clears car doors easily, tiers to 11 feet.

It must be equally apparent—that whether Clark's recommendation is for gas-powered equipment or for electric battery - powered equipment, it is based on *facts*, and is free of prejudices arising naturally out of a one-line approach.

We believe that it will pay you to CONSULT CLARK.

CLARK ELECTRIC AND GAS POWERED **FORK TRUCKS**
AND INDUSTRIAL TOWING TRACTORS

CLARK EQUIPMENT COMPANY, TRUCTRACTOR DIVISION, BATTLE CREEK 61, MICH.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

Quality, plus...

BARBER-COLMAN
ELECTRONIC
MOISTURE CONTENT CONTROLLER

Since its introduction the Barber-Colman Moisture Content Controller has convincingly demonstrated its ability to improve quality and increase production in the slasher rooms of many well known mills. The new and improved, high quality, *all-electronic* unit shown above is applicable to all types of warp as processed on slashers having any type of variable-speed drive. In operation, a roller in contact with the warp as it leaves the slasher, continuously measures the moisture content and, through the automatic electronic circuits of the Controller causes the speed of the slasher to be adjusted so as to uniformly maintain the desired moisture content. The Controller is a proportioning type instrument equipped with automatic reset, hence the moisture content can be controlled at a constant level without "hunting" of the variable speed drive. For further information call your nearest Barber-Colman brance office or write for bulletin F-3156.

45 YEARS EXPERIENCE SERVING TEXTILE MILLS

BARBER-COLMAN COMPANY
ROCKFORD, ILLINOIS
BOSTON MASSACHUSETTS • GREENVILLE SOUTH CAROLINA • GREENSBORO NORTH CAROLINA

debut were of the overfeed type, to be replaced in popularity by the underfeed type shortly before the first World War. Recently the spreader type of firing (overfeed principle again) has made a strong bid for acclaim, especially in localities burning a low grade of subbituminous coal.

Not to be forgot is the development in meters, draft gauges, and controls that are essential to proper operation and record keeping, and, too often, altogether lacking today in a great many plants.

Furnaces. Water-cooled furnaces are growing in popularity, with some designs of steam generators having the furnace integral with the boiler. In the past five years more than 90 per cent of the boilers installed of over 30,000 pounds per hour capacity have water-cooled walls.

In the well managed and efficiently operated textile plant there is a complete record of steam cost per 1,000 pounds, including fixed charges. Cost is broken down into labor, fuel, maintenance, water, general supplies, and fixed charges, including interest and depreciation. Each department to which steam is delivered is charged its proportionate share of the cost determined through meters on branch steam lines.

In the day of the hand fired boiler, firemen, although skilled, were considered in the bracket with the lowest common laborer and generally so paid. In the well managed modern plant he is rated commensurate with his responsibility, required education and training, and classed on a level with skilled operators in other crafts. The more automatic the equipment becomes the more the need for well trained and intelligent personnel, both in supervision and direct operation, to obtain maximum efficiency and long life of equipment.

Considerable research on the problem of smoke has been made in recent years, especially in plants in urban areas. Besides representing inefficient combustion, stack smoke presents a health hazard and an aesthetic problem confronting every manufacturing center.

One of the most notable im-

provements in firing and steam generating equipment in the past fifty years, and perhaps one of the least publicized, is the increase in the furnace volume. It was once the popular and universal conception that the boiler must be set close to the fuel bed to secure proper transfer of sensible heat from the fuel bed, and combustion gases to the boiler heating surface. It is now known that sufficient volume is necessary in the furnace to permit complete combustion of the volatile gases distilled from the coal. Flame travel may be roughly described as the furnace height, and sufficient flame travel is necessary to permit complete combustion of volatile gases before they reach the cold surface of the boiler and are chilled below the ignition point, causing stack smoke.

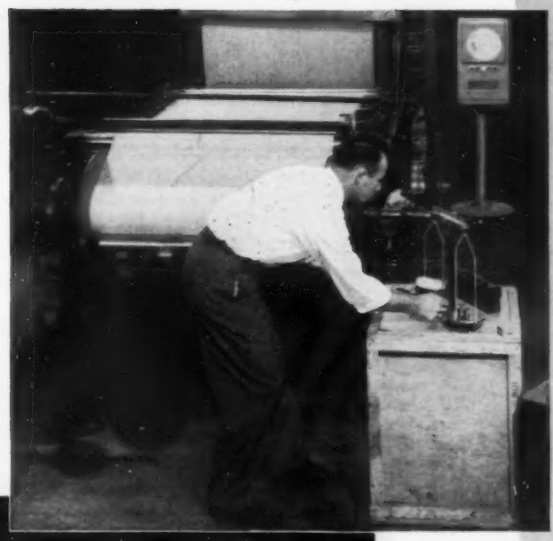
In stoker firing the fuel is fed steadily and uniformly over the fuel bed. All movement of the fuel bed is regular and uniform. Compare this with the intermittent feeding of coal and raking of fuel by hand firing, with the resultant sudden release of large quantities of volatile gases in a furnace too small to allow space for complete combustion. A modern plant, well managed, never experiences objectionable stack smoke.

Much progress has been made in the past half century, and in the past ten years progress has been greatly accelerated. With engineering progress and better training of personnel the next decade should see even more remarkable improvement in the steam plant of the modern textile plant.

Electronic Devices. Electronic applications in the textile industry can be divided into two main groups. In one group are the applications where electronic means are employed to perform a direct result in a particular process. In the other group are the applications where control of such devices as motors, clutches, or other electrical and mechanical devices is derived from electronic impulses properly amplified and directed.

Dielectric heating is an example of the first group. It consists of placing a non-conducting material between two metal plates or elec-

... "Know-How"



BARBER-COLMAN
ENGINEERING SERVICE
FOR
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Barber-Colman engineers, who have gained "Know-How" through years of experience, will at your request and without obligation, make an initial survey of your slasher room, and discuss with you all of the equipment and its functions. They will also make recommendations leading toward efficient and profitable slasher operation. If the analysis indicates the need of Barber-Colman Moisture Content Control, a Barber-Colman engineer will, upon delivery, supervise the installation and accurately calibrate the controllers to match conditions in your plant and of your product. In addition, training courses for mill mechanics are offered at Barber-Colman branch offices to impart this "Know-How" to them and thus assure continued efficient operation of the equipment. This program of *slasher room survey, supervised installation,* and *employees' training* insures the best results — in the form of lower costs, greater production, and better products.

45 YEARS EXPERIENCE SERVING TEXTILE MILLS

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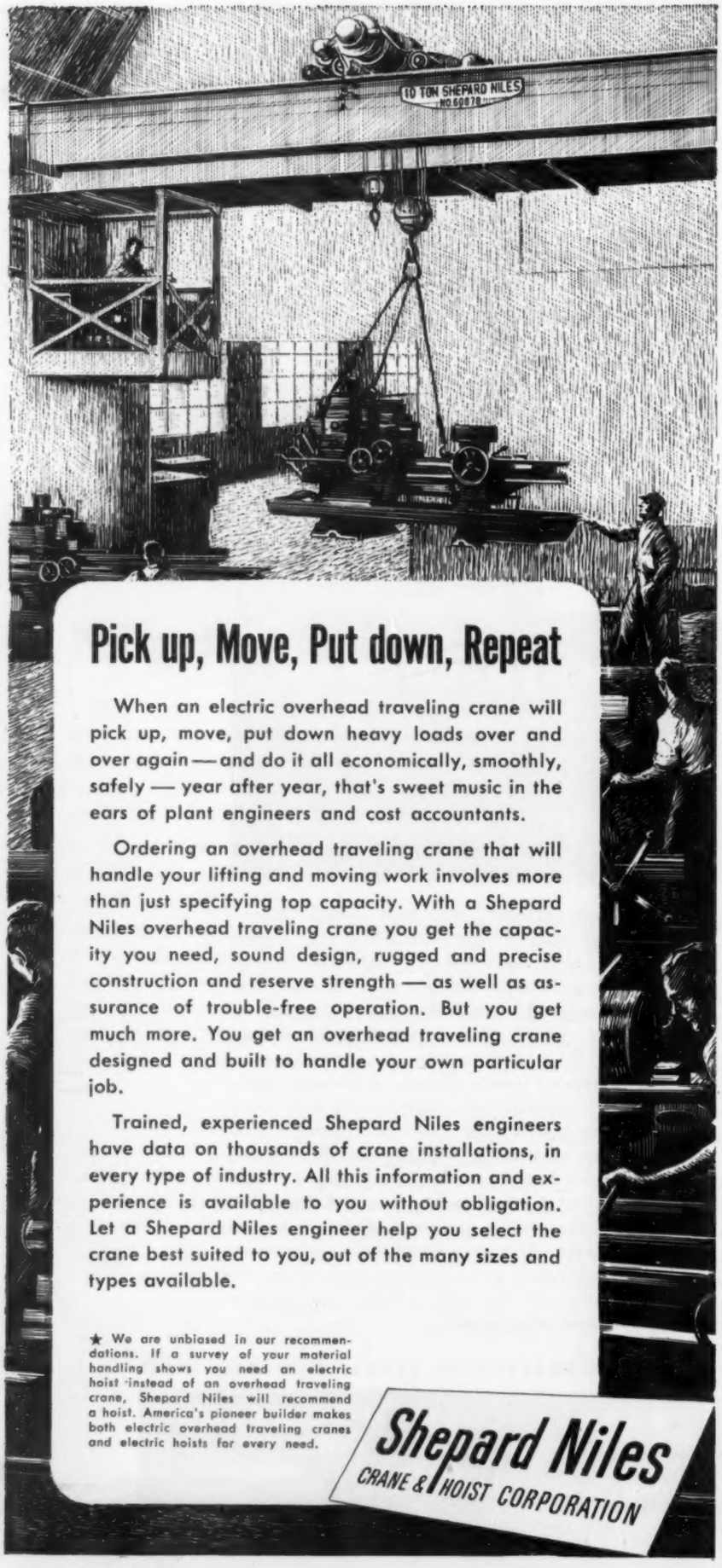

Pick up, Move, Put down, Repeat

When an electric overhead traveling crane will pick up, move, put down heavy loads over and over again — and do it all economically, smoothly, safely — year after year, that's sweet music in the ears of plant engineers and cost accountants.

Ordering an overhead traveling crane that will handle your lifting and moving work involves more than just specifying top capacity. With a Shepard Niles overhead traveling crane you get the capacity you need, sound design, rugged and precise construction and reserve strength — as well as assurance of trouble-free operation. But you get much more. You get an overhead traveling crane designed and built to handle your own particular job.

Trained, experienced Shepard Niles engineers have data on thousands of crane installations, in every type of industry. All this information and experience is available to you without obligation. Let a Shepard Niles engineer help you select the crane best suited to you, out of the many sizes and types available.

★ We are unbiased in our recommendations. If a survey of your material handling shows you need an electric hoist instead of an overhead traveling crane, Shepard Niles will recommend a hoist. America's pioneer builder makes both electric overhead traveling cranes and electric hoists for every need.

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trodes and applying a high frequency alternating voltage to these plates. The frequency used runs from a few millions to 50 million cycles per second. This high frequency is produced by electronic devices. A textile material placed between such electrodes is heated instantly throughout its entire volume. The present limitations are that at least a few inches of thickness of material are required in order that appreciable amounts of energy can be transmitted into the material.

The process is used extensively in rayon twist setting where large spools of rayon are twist-set in a matter of seconds. It is also used in the drying of skeins or packages of various kinds of synthetic yarns. The applications are unlimited, and experiments are now under way to prove the economy of such widely differing applications as thawing out frozen bales of wool, thermo-setting plastic backing for carpets into the bottom of the nap on a carpet, preheating rolls of cloth before immersion into various process solutions, many forms of drying applications, and so on.

Electronic devices also make possible an electrostatic air cleaner that removes all particles of dirt and dust from the air, including smoke, oil vapors, and the like. These electrostatic air cleaners are employed in many weave rooms where silk or synthetic fibers are woven, and by so doing produce a super clean fabric not possible without this device. It is also used to pre-clean air going through dryers handling the fine and delicate silks and synthetic yarns, and this enables packages and skeins of yarn to come out of dryers with a degree of cleanliness and whiteness not possible by any other means.

Electronic tubes of a type that emit huge quantities of ultra-violet light are used to aid chemical processes involved in shrink proofing woolen cloth.

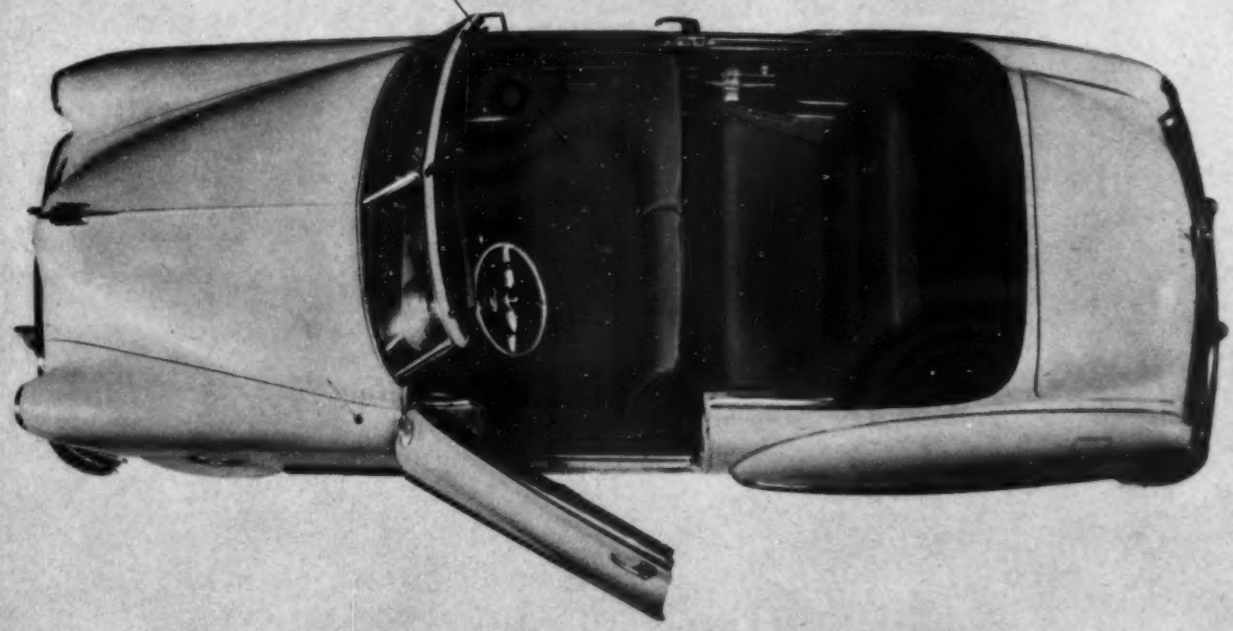
An example of the second group of electronic devices is the case where electronic apparatus is used extensively to measure the moisture content of textiles in various

(*Continued on page* 354)

SARAN

SARAN

BY NATIONAL



distinctive! durable!—seat covers woven of SARAN!

They're fashioned for beauty and long life in the *basically different* textile material.

Saran weaves into these smart seat covers color and beauty that set new standards of durability. And saran is versatile! Monofilaments as fine as .005"—easy to work and easy to weave—are constantly inspiring new fabric trends. For fabrics of saran are decorative as they are durable, and practically carefree. Increasing demand for completely functional fabrics, assures added profit and prestige for those who *turn to saran.*

REG. U.S. PAT. OFF.

Saran by National

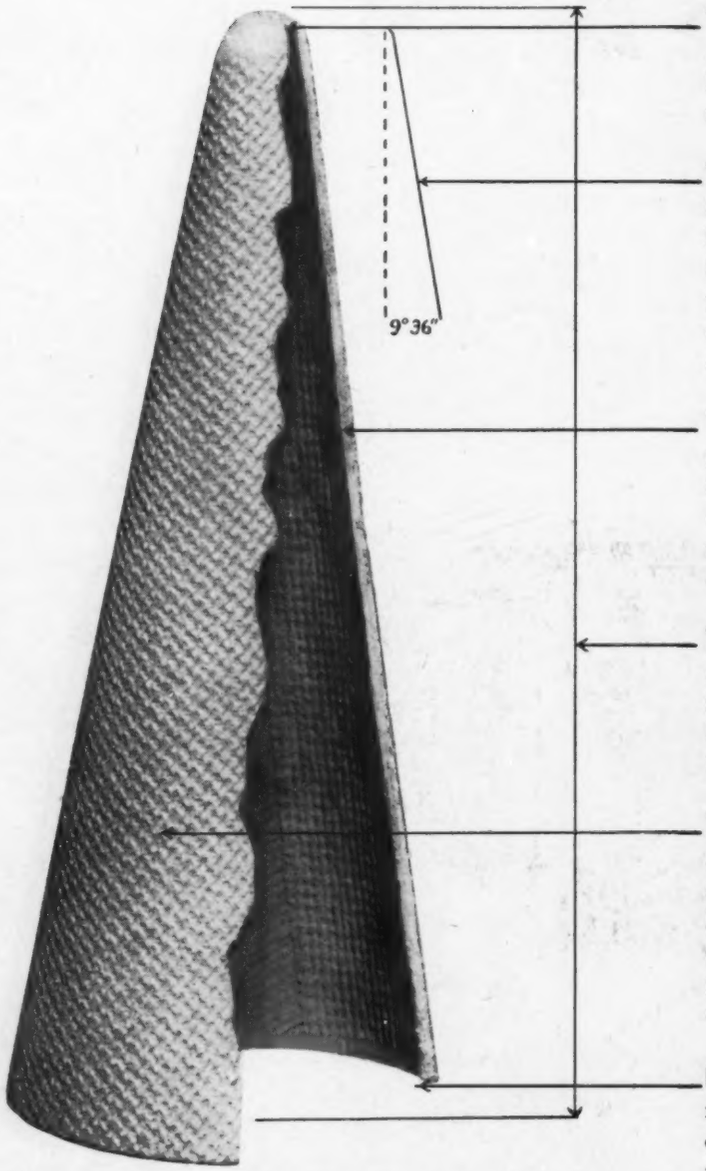
ODENTON • MARYLAND

New York: Empire State Building; Los Angeles: Bankers Building

SARAN

SARAN BY NATIONAL *denotes monofilament, rattan and tape manufactured by The National Plastic Products Company from Dow's saran and supplied to mills, weavers and other fabricators.*

Do You Know These Facts About a SONOCO Cone



The NOSE—Various types have been perfected . . . Open—closed—round—straight—polished—lacquer tipped . . . all developed to prevent roughness that will snag the yarn upon delivery.

The TAPER—From 3° 30" to 9° 36" depending on use and type of winding equipment. Rayon cones are usually either 3° 30" or 5° 57' (12–E). A special tire cord cone is 3° 51'. Heavy yarns, however, usually take a steep taper such as 7° 10', 8° 14', 9° 15'. Hosiery yarns use 9° 15' and 9° 36'.

The WEIGHT—Cone weights are based on pounds per 1000. SONOCO cones are available in light, medium and heavy weights depending on the strength desired. The weights, determined by wall thickness and size, range from 43 pounds per 1000 to 210 pounds per 1000.

The LENGTH—Any length is available in most cones. Certain standards are practiced, however, in certain type cones. Most lengths are between 5¾" to 7". SONOCO makes cones 9¼" and 10½" long.

The SURFACE—A wide cone surface range is available from smooth to deep corrugated, plus scoring. Depending on the yarn, surfaces have been developed—all velvet on smooth or corrugated paper finish—velvet bands on smooth paper finish—flocked finish on smooth paper—deep corrugated or medium corrugated.

INSIDE DIAMETER at BASE—An accurate dimension to insure exact seating position of cone on winding mandrel and to permit package build-up on center of cone.

Further specifications can include colored paper, colored lacquer or stained tips, printing—either inside or outside, visible-run-out bands, special treatments for toughness, waterproofing, mildew, acid or alkali resistance, and perforating for package dyeing. Truly—"A SONOCO Cone for Every Purpose," is a statement that only SONOCO can make.

SONOCO PRODUCTS COMPANY

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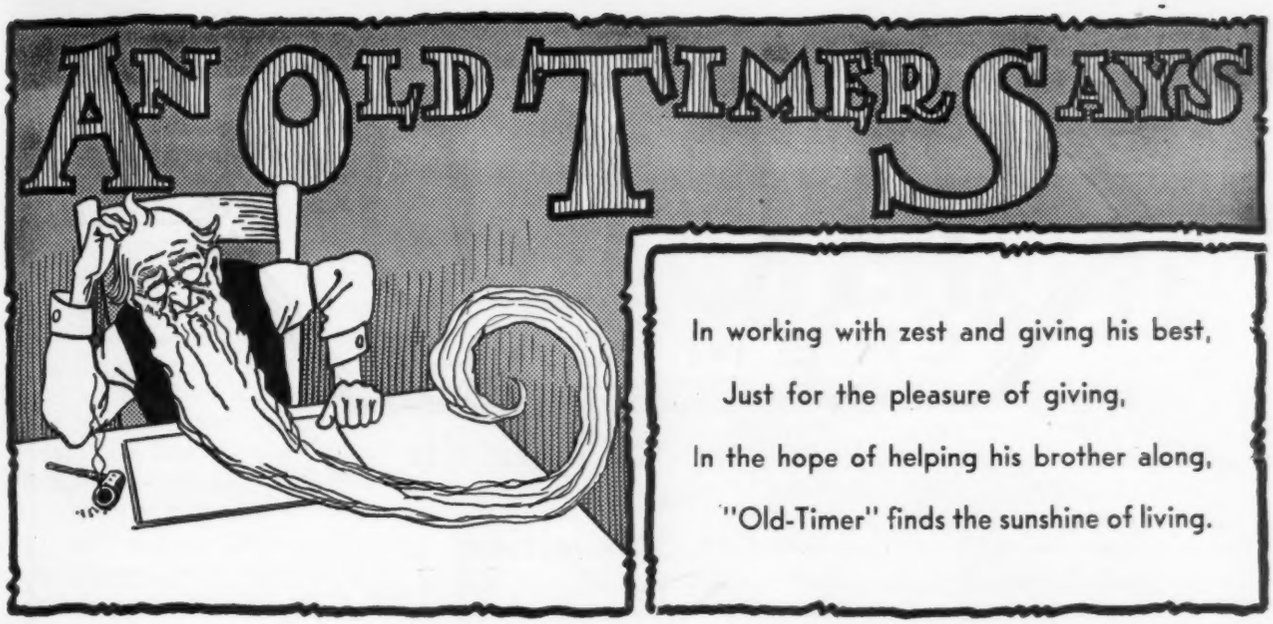
AN OLD TIMER SAYS
In working with zest and giving his best,
Just for the pleasure of giving,
In the hope of helping his brother along,
"Old-Timer" finds the sunshine of living.

Some Old-Timer Experiences of 40 Years Ago

IT IS PROBABLY difficult to realize that in the span of only one man's lifetime the textile industry had practically no, what may be termed textile chemists. That was back when OLD-TIMER had his first overseers job. A large number of cotton mills were making their own belt cement, their own soaps, and their own warp sizings.

OLD-TIMER realized that far back that weather conditions greatly affected the running of textile machinery, especially spinning and weaving. Carding too was affected, but not quite so radically as spinning and weaving.

Many mills had no humidifiers in carding and spinning, some had humidifiers in both spinning and weaving but none in carding.

We worked in one mill which had no humidifiers in carding, spinning, or weaving. To make matters worse, this mill, which had no humidifiers at all was on heavy numbers, weaving heavy sheetings, and, of course, there was a lot of fly. It was lighted with large kerosene lamps similar to the lamps some stores used in those days.

Kerosene Lamps. Each loom fixer lighted the lamps on his section by using a small hand kerosene lamp which had a round wick that made a flame about like a candle. This small hand lamp eliminated the necessity of striking a match to light each lamp. We used a low step ladder just high enough to reach the lamp when standing on top of the step ladder.

It was a porter's duty to take down and wash the large brass bowl and chimney of the lamps. This washing of the brass bowl usually left the bowl slightly damp and fly, helped by static electricity, would accumulate in long strands on the lamp bowls.

One day OLD-TIMER pushed his step ladder almost directly under one lamp, and when he raised up to light the large lamp with the small hand lamp, the flame from the hand lamp passed through those long strands of fly protruding from the brass bowl and ignited the fly—it went Poof!

A large cloud of black smoke rose to the ceiling. However, it left the brass bowl looking just as pretty and bright as though it had just been washed. Good way, we thought, to have all the lamps looking so clean. So we went right on down the alley touching the flame from the hand lamp to each brass bowl. Poof! Poof! They went —almost like popping a small paper bag filled with air.

But about the fourth or fifth lamp we got to, Mr. Guy, the overseer grabbed us by the leg:

"What in heck are you doing—trying to burn the blankety-blank

DYESTUFFS
ACCO
CHEMICALS

Manufacturers of Dyestuffs
and
Chemical Specialties
for the
Textile Industry

AUGUSTA CHEMICAL CO.
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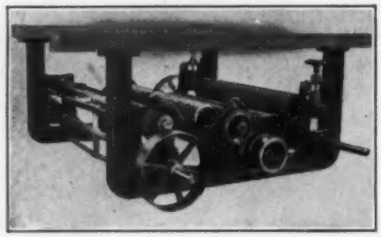
BIRCH TREE

A Famous Trade Mark for 65 Years



PRESENT DAY HEAVY DUTY BALL BEARING SCUTCHER

The original scutcher was invented by William Birch of Manchester, England. Introduced in this country in 1883 by Albert Birch.

PATENT ADJUSTABLE SLOT VACUUM EXTRACTOR WITH PATENT AUTOMATIC RING TYPE SLOT SEALS

Another forward step in the drying of textiles gives improved extraction and better "handle".

BIRCH BROTHERS, Inc.

Harold W. Birch · Clifford W. Birch · Stanley W. Birch

Southern Representative
JOHN C. COSBY
Greenville, S. C.

SOMERVILLE, MASS.

DYEING AND FINISHING MACHINERY AND MILL SEWING MACHINES

mill down? I ought to fire you for having no more sense."—and that's not all he said, but OLD-TIMER'S section was leading all the others in production, and we guess that is why we were not fired. Today that mill is an up-to-date mill and running full blast.

Wooden Flat Cards. When we say that spinning and weaving were most affected by weather conditions, we are, of course, referring to mills which had the new revolving flat top cards, because OLD-TIMER was superintendent of one mill which had the old stationary wooden flat tops.

It was double carding. That is, the breaker cards were all delivered into one railway head; then the laps from the railway head were placed on the backs of the finisher cards. When it rained on Saturday night or Sunday, while the cards were standing, we could not start these cards up Monday mornings until we went over all the cards and backed off the wooden stationary top flats.

The cards had an automatic flat stripper which was "out of this world," as the slang expression goes. The automatic stripper was supposed to pick up one flat at a time and strip it, but more often it would pick up a flat, "jiggle" it around a few times, and throw it out in the alley.

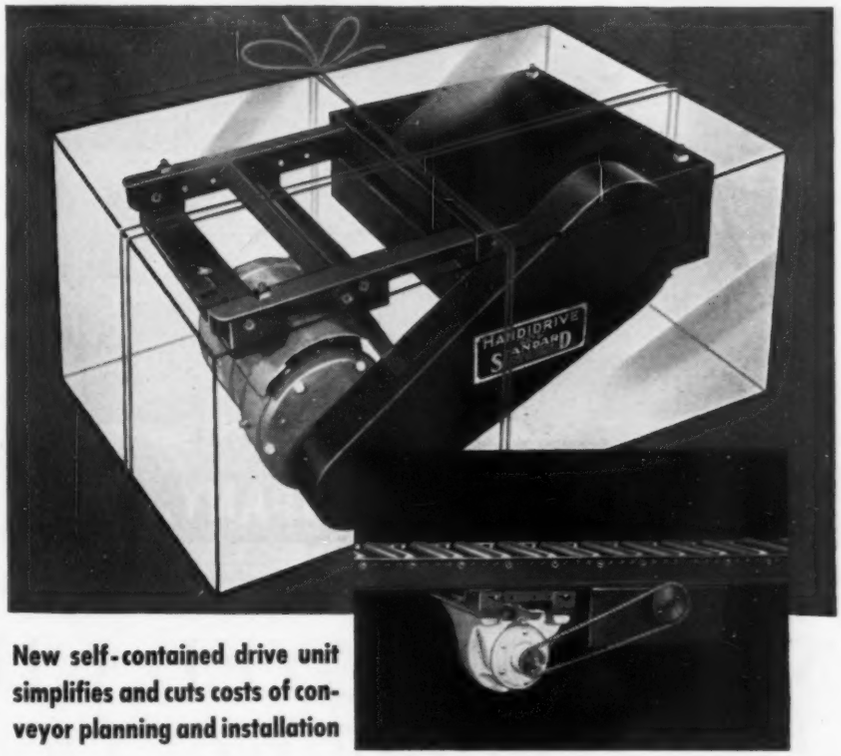
But to get back to what we intended to tell you about—a little joke on OLD-TIMER. We were always "monkeying" with the warp sizing in an effort to prevent dry, windy weather from causing so much loom stoppage by broken warp threads. By studying all the books on chemistry we could find, we finally realized that cotton is very hygroscopic and that moisture added greatly to the elasticity of a cotton thread. Then we hunted for something to put into the sizing to attract moisture. This research led us to the chlorine they used in bleaching and then on to chlorides, both calcium and magnesium. We believe we were the first cotton mill in the South to use chlorides in homemade warp sizing. Boy! How it did help the running of those warps.

Then in 1905 (we believe it was) we had a very bad cotton year.

New "Power-Package" Unit for Roller and Belt Conveyors

THE STANDARD

HANDI-DRIVE



New self-contained drive unit simplifies and cuts costs of conveyor planning and installation

Here it is! A packaged power unit that gives every conveyor user the opportunity to be his own layout engineer — to change his conveyor system to suit varying plant conditions in a minimum of time!

Converts gravity conveyors to live belt or roller conveyor quickly . . at low cost

The Handi-Drive is designed to provide quick, simple conversion of an ordinary roller conveyor to a moving or "live" belt conveyor or a conveyor with power driven rollers. Equally important, using standard units you can build a conveyor system custom-planned to your individual plant needs. Units are stocked at the factory — get them now!

If you want to convert your present gravity conveyors to powered units — or if you want to install your own new system . . . send for the Handi-Drive Bulletin No. C-78. It gives you complete design information and prices — tells you how to lay out your system, gives complete data on inclines, belt and roller widths, curves, weights to be handled and types of packaging or units to be moved. Write: Standard Conveyor Company, North St. Paul, Minnesota.

SEND FOR HANDI-DRIVE BULLETIN

Standard
GRAVITY & POWER
CONVEYORS

10,500,000 FEET OF *HOLT* MAPLE FLOORING!

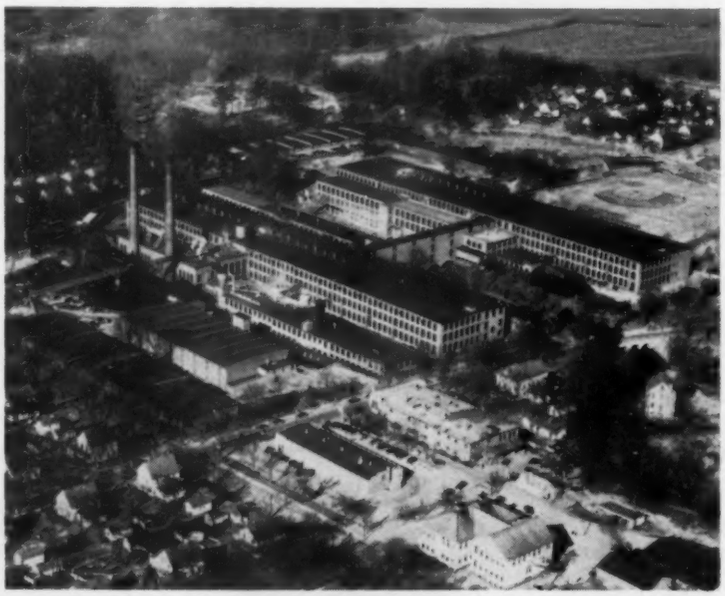
Have gone into southern textile mills since 1920—with complete satisfaction to the mill operators.

When you think of floors, remember to specify Holt Flooring, made from Northern Wisconsin-Michigan Hard Maple.

REPRESENTED
in the South
by Bright-Brooks
Lumber Company
Charlotte, N. C.

HOLT HARDWOOD COMPANY., OCONTO, WISCONSIN

NEW VAT-DYED CHAMBRAY
Made In PEPPERELL'S Georgia Mill



2,500 skilled people, 112,000 spindles, and 3,100 looms produce Pepperell's famous line of work clothes fabrics here at Lindale, Georgia. Lindale, too, is the home of Pepperell's new vat-dyed chambray . . . the work shirt fabric hailed as another Pepperell first in fabrics "loomed for quality—produced in volume."

PEPPERELL FABRICS

The cotton was of such poor spinning quality, and we had to put in so much extra twist to get the ends to stay up on the spinning, that cotton mills all over the country had looms standing because the spinning production was off so badly.

During this time OLD-TIMER was working frantically to find something which would help the situation. Even with what production we could get out of the spinning, the loom production per loom was off considerably.

Bee's Wax in Sizing. A bright idea (we thought) struck us. We had seen the cobbler draw his thread through a piece of wax to sew leather soles on shoes. Why in the heck hadn't we thought of that before? We sent a man, in a buggy, out through the country to tell the farmers we wanted to buy bee's wax.

And did we get bee's wax! It came in balls; it came in dish pans; farmers came to our house at all hours of the night and Sunday with bee's wax.

Well, we started putting two pounds of bee's wax in each kettle of size. We would put the spinning room yarn reel in front of the slasher to take off samples of our new wonder—warp yarn with bee's wax in it. But the yarn did not show any increase in breaking strength.

Not enough wax, we thought, so we put in four pounds of bee's wax—still no increase in breaking strength. We are ashamed to tell you just how far we went with this experiment, but the loom fixers and overseers of weaving began to tell us how much better the warps felt, so nice and smooth.

However, OLD-TIMER sure was puzzled. He could not understand why the bee's wax had not increased the breaking strength. He knew a chemist in Boston, Mass., but Boston was a long way off, and train fare was quite an item. As superintendent, we were drawing down the handsome salary of $166.66 per month, $2000 per year. But we were determined to learn something about the textile manufacturing business, so we emptied the kiddies' little savings banks, kissed them good bye, grabbed the

LIGHT METER shows 60 foot candles reflected from dry-cleaned floor, 10 foot candles from scrubbed floor. (Name of customer on request.)

Because they're DRY CLEANED, with the TENNANT Floor Maintenance System

Tennant Floor Machines are available for 8", 12" and 16" drum accessories.

Measuring light-reflection with a meter, this mill superintendent finds that his Tennant *dry-cleaned* floors are 500% brighter than adjacent areas (which were scrubbed). In addition dangerous slip-hazards have been decreased, rough spongy surfaces eliminated and average cleaning *time* per square foot has been cut by about 80%.

Safe Working Conditions Boost Employee Morale!

Dark, slippery, oil-soaked floors absorb light, cause accidents and lower morale. But with the Tennant System *your floors can quickly be reconditioned* and made clean, dry and bright—real assets to your mill's production.

- ***Restores.*** Removes dark, soft topwood fibers; leaves sound, vigorous surface.
- ***Hardens.*** Seal fills, binds, hardens floor. Makes it bright, durable.
- ***Dry Cleans.*** Eliminates scrubbing! Keeps floors clean, smooth, bright. Fast, convenient, economical.

WRITE FOR BULLETIN

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2585 N. 2nd Street
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The way to finer floors
ELIMINATE **TENNANT** SCRUBBING
Floor Maintenance System

74 Years of Progress . . . .
plus 25 Years of Pioneering in

SPRAY-APPLICATION TECHNIQUE

TEXTILE PROCESS COMPOUNDS

MINOTINTS

Oil-base fugitive tints for all synthetic and natural fibers.
Identification — Lubrication — Conditioning

RAYON OILS		SS BASE OIL
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BRETON OILS FOR WOOL

Accurate trouble-free application of spraying oils and tints by the new pressure method which eliminates pumps and moving parts. Simplification is progress and ours is backed by 74 years' experience.

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Established 1874

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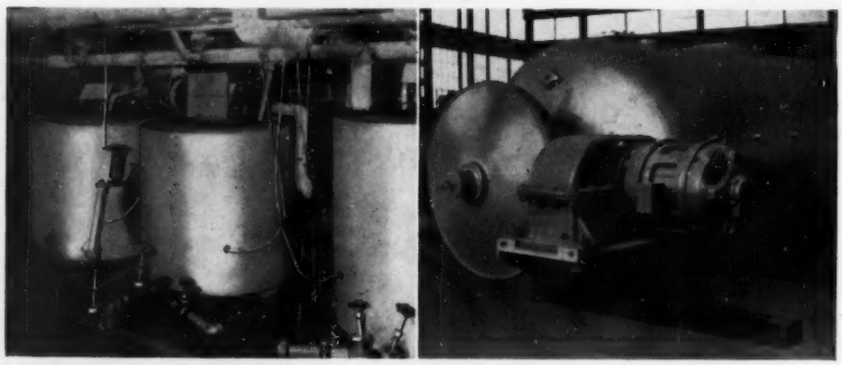
● Cole engineers have the know-how, born of long experience, to give you the finest in vessels for textile liquids—the finest in metal alloys, the finest in design and workmanship. Pressure vessels, starch kettles, kiers, digesters. If you want the best, come to Cole.

Write for a free copy of the Cole catalog — "TANK TALK"



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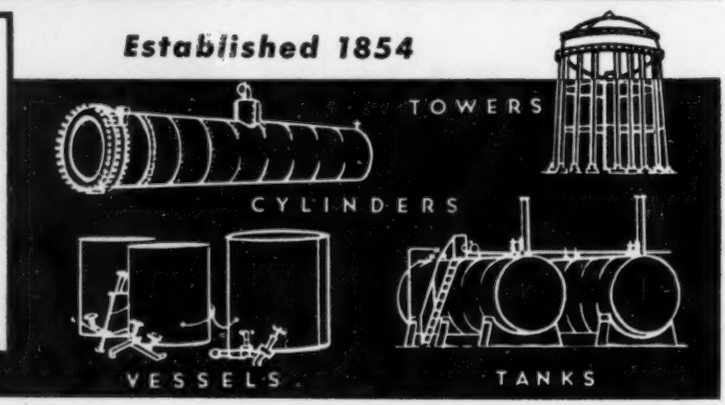
MANUFACTURING CO.
NEWNAN, GA.

Established 1854



shoe box of sandwiches the good lady had fixed up, and pulled out for Boston in a day coach.

After explaining, as best we could to Mr. Neff, the chemist what a loom was, what a warp was, and why we were trying to make each thread stronger by using bee's wax—he leaned back in his chair, closed his eyes and said: "Young man, you have a great idea, but your application of the bee's wax to the little thread is all wrong. You must take each little thread and draw it over the piece of bee's wax. That will lay all the little protruding fibers which are sticking out, and your little thread will be much stronger and smoother. When you put the bee's wax into solution—you do not do that."

We were so darn depressed that we just walked all the way back to the railway station and sat there until the next train South. We don't even remember how long we waited for that train.

On the train, with plenty of time to think, all at once it dawned on us that we had not stopped them at the mill from buying wax before we left. We could see mountains of bee's wax awaiting our return.

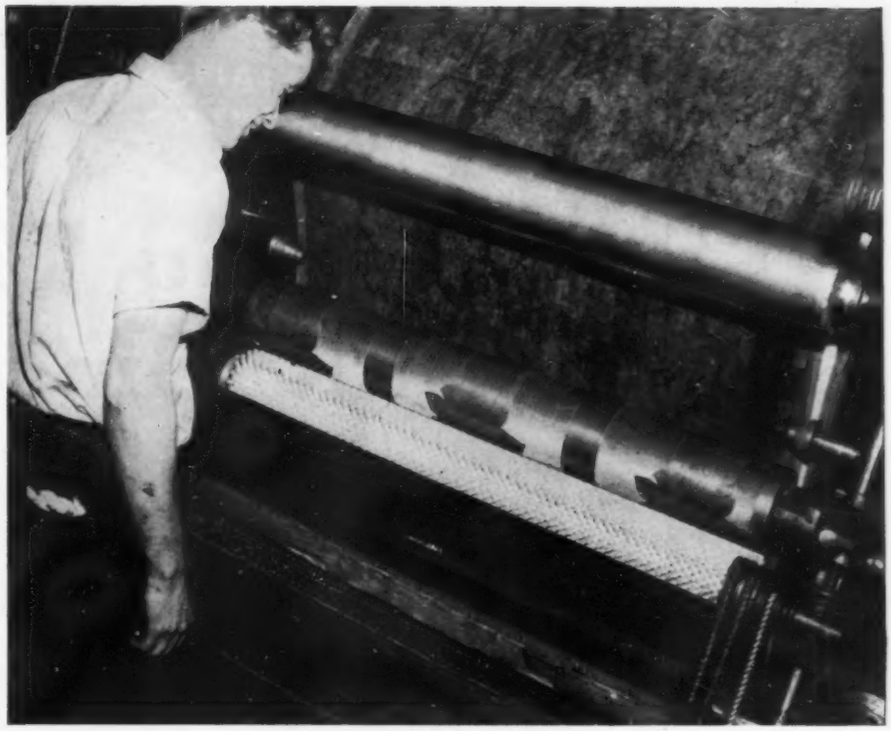
However, first thing the overseer of weaving said when we got to the mill was, "that wax sure is helping us. Our warps and cloth feel smoother than any warps I have ever run." Therefore, we continued to use just sufficient wax to produce a good hand to the cloth. The loom fixers all thought the warps ran better because they felt better, and they told the weavers.

Bee's Wax Psychology. Here, gentlemen, was one of our first experiences in seeing psychology pay off. Production per loom went up, and weavers and loom fixers seemed happy. This certainly put us to thinking.

What could we do to create mass psychology among operatives?

If we could only find the answer to that question we knew we would have something.

Some of you readers probably think OLD-TIMER harps on psychology too much to you in so many articles; then take notice of



"Metlkor" nylon bristle furnisher brush, used for color application in textile printing.

For Greater Efficiency and longer brush life, turn to - - -

METLKOR TEXTILE BRUSHES ARE USED:

BY PRINTERS for furnishing color, brushing prior to printing, blanket washing and drying, and soaping in screen printing.

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BY COTTON AND WOOLEN MILLS for carding, shearing, brushing, and reed cleaning.

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BY WOOLEN AND WORSTED MILLS for flock raising and laying, carding, combing, singeing, pressing, teasel cleaning, teaseling, polishing and steam brushing.

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BY CARPET MANUFACTURERS for carding, furnishing, shearing, sizing and brushing.

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ALSO FOR MANY SPECIAL PURPOSES.

RENEWABLE BRISTLE

METLKOR

(Trade mark Reg. Pending)

TEXTILE BRUSHES

They're the highest quality brushes we have seen in our more than 70 years as manufacturers of industries brushes exclusively.

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Their CORES of aluminum or cold drawn steel are practically indestructible. They do not sag, break, or get out of alignment, as wood cores will.

BRISTLE is wound on these cores with specially formed metal strips, in which tufts of bristle are firmly held and sealed in with special plastic cement, by a patented process.

BRISTLE IS RENEWABLE when it wears down.

NYLON BRISTLE is available for longer wear and easy cleaning.

Get the full story of METLKOR Textile Brushes from—*

M. W. JENKINS' SONS, Inc.

CEDAR GROVE **ESSEX COUNTY** **NEW JERSEY**

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The Flooring That Has "Taken It" Since 1875

Satisfying customers with industrial flooring of Northern Maple, Beech, and Yellow Birch, has been our business for 73 years. Our contribution to the textile industry's progress has been Quality Flooring, Prompt Service, and the maintenance of a mutually Friendly Relationship.

J. W. WELLS LUMBER CO.

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Mount Hope CLOTH OPENING EQUIPMENT

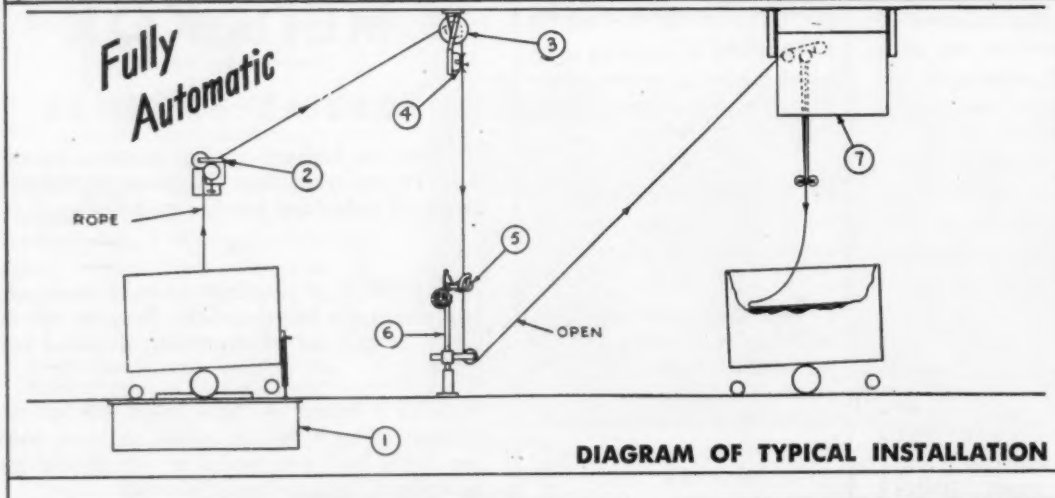


DIAGRAM OF TYPICAL INSTALLATION

INCLUDING

- Automatic Turntable Detwister (1)
- Tension Squeezer (2)
- Overhead Sheave (3)
- Detwister Switch (4)
- Swing Guider & Opener (5)
- Guider Stands (6)
- Plaiter (7)
- Draw Rolls
- Steel Pot Eyes

This fully automatic equipment opens cloth from the rope regardless of the amount of twist.

Mount Hope Devices Give:

1. COMPLETE SAFE FABRIC TREATMENT
2. MINIMUM MAINTENANCE
3. QUIET OPERATION
4. INCREASED PRODUCTION

Send for Bulletin SG-CO which gives full information, including prices.

MOUNT HOPE MACHINERY CO., Taunton, Mass., U. S. A.

Representatives—Parkman Collins Company, Boston—for Maine • Ingalls Engineering Company, Providence—for N. H., Mass., R. I., and Conn. • John H. Andresen, Inc., Paterson—for Southern N. Y., N. J. and Pa. • Slaughter Machinery Company, Charlotte—for the South • S. S. Wilson, 1737 Howard Street, Chicago—for Mid-West • Sidney Springer, Los Angeles—for California • W. J. Westaway, Limited, Hamilton and Montreal—for Canada.

this simple fact we have outlined for you about wax. Well we have applied the idea to production in hundreds of ways—we have applied it at times when we wished to make changes in operatives' work; for example, when we decided to put on roll cleaners in the spinning.

Remember psychology is only common sense dressed up, but if you apply it correctly, it works.

The supply of bee's wax from the farmers soon dwindled down to nothing, and we prospected around for wax in commercial quantities. We found Japan wax (a vegetable wax) in boxes of 100 lbs. and purchased it for some time. But one day a salesman who sold us lubricating oils told us he could save us some money on Japanese wax. Ok! We started buying our wax from him. A few months later we received a wire to catch the next train to the finishing plant where our cloth was printed. (The company paid our expenses this time.) Most of our production was 27″ print cloths. Arriving at the finishing plant office, the manager asked "How in heck do you get so much oil on your cloth?"

I told him that I did not know there was any oil on our cloth. In fact, I was sure there was no more oil on it than the few small spots we had always had and which every mill has. (We had no oil remover liquids in those days.)

The finishing plant manager said, "No, you are wrong. You have done something recently. You have spots as large as my hand, and they are all through some of the rolls of your cloth. Come to the plant with me and I will show you."

Sure enough, as the cloth ran over the machines, spots, large and small, showed up and they looked like oil spots.

All the way back South we could not sleep. In fact we did not want anything to eat. Just coffee —lots of coffee. Finally it came to us that the oil only showed up in solid dark patterns of the print cloths. We sent the finishing plant manager a telegram, and he confirmed this fact. Then we were only more confused.

Why should it show up on the

Control Costs with TOLEDO ACCURACY

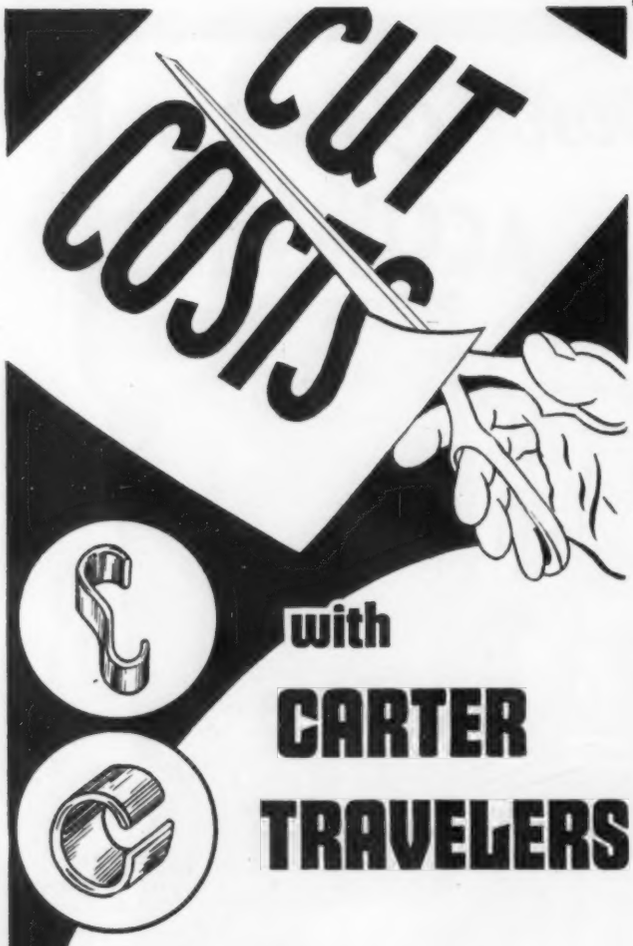
Let modern weighing equipment take the guess-work out of your textile production lines! At every step . . . Toledo Scales can help you guard your costs. Toledos "fit the cloth" of modern textile needs . . . with dependable automatic weight indication to give the *speed* and *accuracy* essential to material and production control. Toledo Scale Company, Toledo 12, O.

Send for this ➡

New illustrated bulletin No. 2020 shows Better Ways to control costs.

TOLEDO

HEADQUARTERS FOR SCALES



Economy is your name for it . . . we call it *quality*. With CARTER TRAVELERS they mean one and the same thing—*increased profits.*

You save money with CARTER TRAVELERS simply because they do their vital job efficiently, give long, trouble-free performance and wear less on expensive rings. You will find, too, that these precision made, high quality travelers will help you produce finer, stronger yarns.

On every count CARTER TRAVELERS lead the way to production profits.

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DIVISION OF
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R. D. HUGHES SALES CO., 1812 South Main Street, DALLAS, TEXAS
HUGH WILLIAMS & CO., 47 Colborne St., TORONTO 1, CANADA

GREEN RIVER MILLS

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TUXEDO, NORTH CAROLINA

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Spinners and Processors

FINE COMBED YARNS
8's to 80's Single 2-3-4 Ply

COMBED PEELER, COMBED SAK

GASSED, MERCERIZED,

and BLEACHED

SKEINS, CONES, TUBES

for the

THREAD, WEAVING, KNITTING TRADES

Also

ACETATE AND COTTON COMBINATION YARNS

solid dark patterns only. This caused us to believe it wasn't oil. But what it was we did not have the remotest idea.

Arriving at the mill, we had no idea where to start or what to look for. We did start a system of elimination similar to the system we had used in looking for cut roving or some trouble like that.

One day we had boiler trouble which stopped the mill, and while sitting in the boiler room waiting for the boiler to be repaired, we were still concentrating all of our thoughts on the oil spots in the finished cloth. We continued trying to eliminate one thing at a time. We had tested the tallow, which we used rather large quantities of in sizing, and we decided to test the Japan wax.

We sent a negro boy to the supply room to get a cake of the wax.

The supply clerk misunderstood and sent the boy back with a whole case of wax. We instructed the negro boy to open the box and place a cake of the wax on a shovel and hold it in the boiler until the wax melted. We did not have much idea what we were doing, but we had to be doing something. As we sat there we noticed the Japanese lettering on the wooden box, and right under that was what caught our eye. This wax was manufactured by an American oil company. We wondered what in heck an oil company would have to manufacture a vegetable product from.

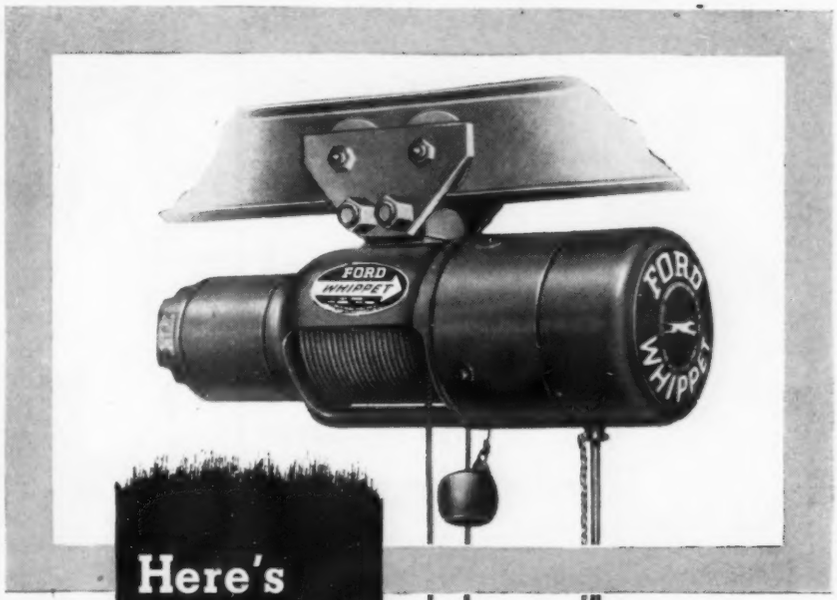
We rushed to the telephone and asked the oil salesman to come right out as we wanted prices on a large quantity of Japanese wax. OLD-TIMER was so darn nervous he could hardly wait to tell the salesman what he had in mind. Anyway, after some of the usual conversation: "Mr. Salesman, your firm manufactures this Japanese wax, does it not?"

"Oh! Yes," he replied, "it is used in large quantities by paper manufacturers and other firms."

O.T.: "Well, how can you call it Japanese wax?"

Salesman: "Oh, that is just a trade name." (Remember Mr. Reader, this was 40 years ago.)

O.T.: "Then you manufacture this wax from oil by-products, don't you? And, therefore, it is a



Here's the Hoist .....that's.....

SLICK AS A WHIPPET!

■ For years FORD has been developing and refining this new electric hoist. Now it has been tested, proved and acclaimed by users everywhere. The new FORD *Whippet* is an answer to your need for greater speed . . . moving more material per hour, or minutes, at less cost. It's fast, safe, dependable, sturdy. It runs smooth and easy—*slick as a whippet.* Wide range of capacities up to 1 ton. See your FORD distributor today, or send for your copy of folder DH-1325.

Ask your FORD distributor about the famous FORD Tribloc. He also offers a complete line of high quality spur-gear, screw and differential hoists —other special hoisting equipment.

ACCO

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TRADE MARK

In Business for Your Safety

the Greatest **TARP Sales Appeal** *in 50 years* **OF TEXTILE PROGRESS**

Fulton
TRIPLE-STRENGTH
TARP

with the Owner's name on it!

THE TARP THAT'S NEW and DIFFERENT

Now the owner of the new, all-weather FULTON Tarp can have his name printed on it to protect against theft and loss. The FULTON Tarp is distinctive, too—bright colored canvas reinforcements under the rust-proof grommets give triple-strength at points of strain. FULTON —distinctive in looks—tops in quality—the easiest of all tarps for you to sell.

THE TARP OF 1,000 USES —

New markets are opened for sales because the FULTON weather-proof Tarp is an all-purpose tarp. Gives ideal protection against rain, sun, wind and dust. It's flexible, easy to fold —will not mildew or become gummy or stiff. Let this special, self-selling new FULTON tarp corner the tarp market for you.

Take advantage of the profitable new FULTON Tarp dealership with free advertising helps. Write today to

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MANUFACTURERS SINCE 1870
NEW ORLEANS • ATLANTA • DENVER • MINNEAPOLIS
NEW YORK • ST. LOUIS • DALLAS • KANSAS CITY, KANS.

Takes *less* Time

for Loading, Heating, Lacing, Doffing, Cleaning

Gives you *More* Time *for the actual dye runs which build your profit*

AND it pays its way handsomely by cutting water and steam costs lower than ever. Everything *YOU'VE* ever wanted in a dye box has been incorporated in

The New BLICKMAN Fully Enclosed Stainless Steel Dye Box

Send for further information

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207 GREGORY AVENUE • WEEHAWKEN, N. J.
Manufacturers of stainless steel textile equipment, dye boxes, linings, cylinders, dry cans, rolls, hoods, tanks

mineral product which will not saponify with water. That is, it will not mix with water."

Salesman: "I suppose you are right, but I am no chemist, and I can't say positively."

Well good-day, Mr. Salesman.

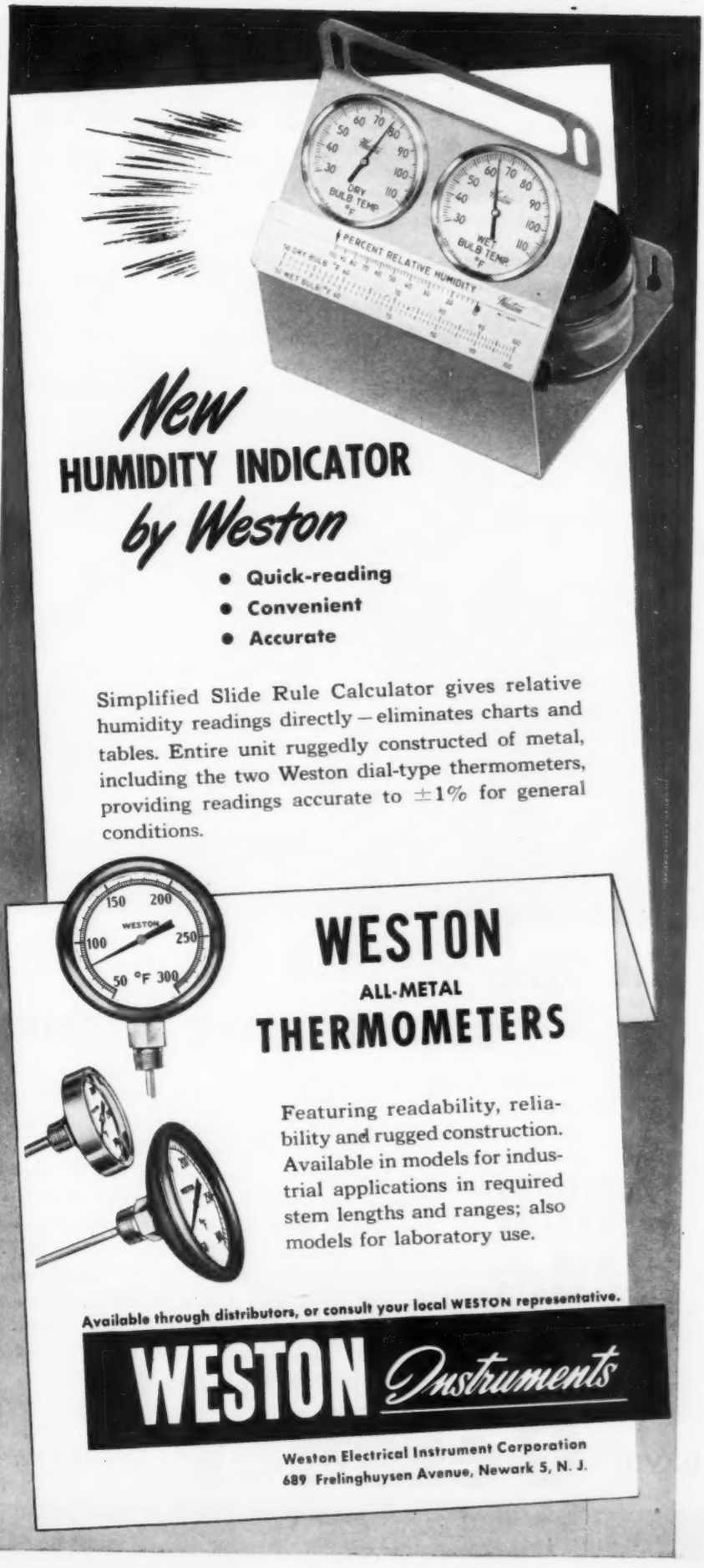
And that, gentlemen, was the solution to our problem of oil spots on the certain colors of print cloths. The mineral wax was not mixing or saponifying in our sizing and, of course, when a spot of it stayed in one place it would show through the dyed cloth.

We had learned two very important things about wax. First, it would not increase the breaking strength of warp yarn, and next, if we were going to use wax at all in sizing, be sure it is vegetable wax. What we had learned about wax was insignificant to what we had learned about working people. Psychology—human relations became our paramount study from that time on, and we are still studying.

Of course, things like our wax experience could not happen today, but you young fellows who have at your command the experience and knowledge of chemists, engineers, psychologists, books and textile magazines, all just for the asking, can see that in his efforts to learn something about textile manufacturing, OLD-TIMER had some rather amusing experiences —probably amusing to you, but rather nerve racking to the old man.

However, as time "marched on" and with cotton ranging from 5 cents to 10 cents per pound, at one time it was considered patriotic to buy a bale of cotton for $25.00 and store it to help boost the low price. Operating a cotton mill became more and more competitive during the many unprofitable years the mills labored through. Many of those agonizing experiences that OLD-TIMER had to fight his way through proved quite profitable in later years, thus enabling him to "beat the other fellow," and that paid off quite well. Yes, quite well.

The thought which prompted telling you about some of OLD-TIMER'S long ago experiences came while in conversation with a friend who is one of the more suc-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cessful young superintendents of a large cotton mill. We cannot recall how or why we got started on the subject, but while narrating to him an amusing and somewhat embarrassing experience we had had long before he was born—all at once he snapped his fingers and said: "That gives me an idea."

Several months later OLD-TIMER had a very nice letter from this young superintendent, which made us glow with pride, because nothing gives us more pleasure than to have a brother overseer or superintendent tell us we have been of service to him. (See the four lines at the top of OLD-TIMER page.)

Therefore it is possible, if not probable, that some one may get an idea from the old time experiences related in the story in which we told you about the bee's wax and the lesson we learned in psychology. Speaking of the pleasure a person derives from helping others brings to mind a very simple illustration, which by the way, did not happen 40 or more years ago:

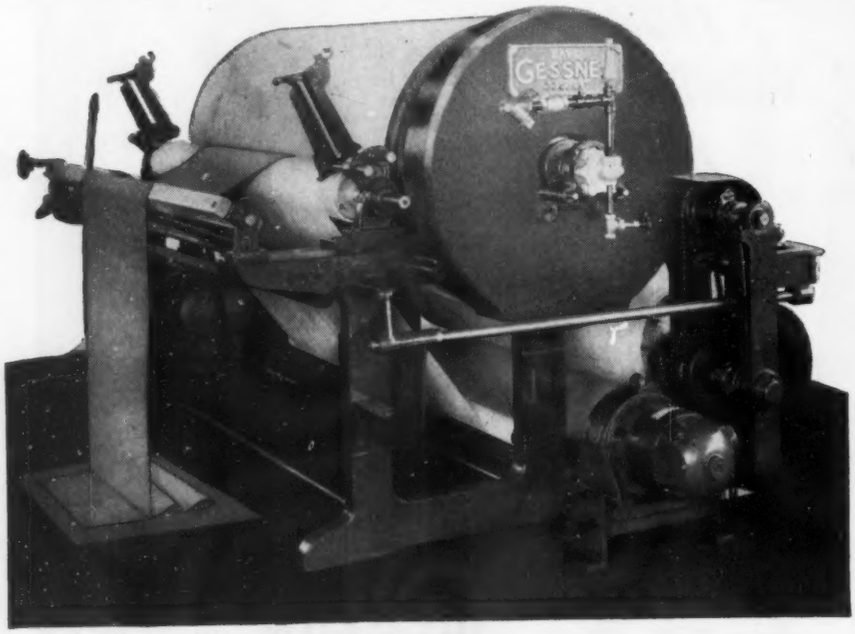
Pleasure from Helping Others. OLD-TIMER was caught in New York one Christmas Eve night, having been called there on important business. Two or three of the New York men connected with the same firm invited him to have Christmas dinner with them, but realizing that Christmas is a time for family ties, he graciously declined. After dinner at the hotel, he did not feel very much like going to a show; in fact, the old boy was just a little lonesome. He decided to take a walk.

A few flakes of snow were in the air, but strange to say, it was not very cold. As we walked down the street we noticed a colored boy, probably 12 years old, standing in front of a bakery window gazing at the appetizing cakes, pies, tarts, etc. We walked up to the window too, but the little negro did not move or seem to notice us at all. Trying to see what he was looking at, we noticed some red cherry tarts, 10 cents each. We slipped a dime into his hand and pointed at the tarts. Boy! he was through that door in nothing flat.

This prompted us to go back to the hotel, get a dollar's worth of dimes and start out looking for kids. Gentlemen, we had a perfectly wonderful Christmas with a dollar's worth of dimes.

Mill Books and Rules. Remember what we told you in one article about the book we compiled of information about each style of goods in the weave room, such as the reed and harnesses, number of filling and number of warp, production per loom in pounds and yards, hank roving, drafts, etc. Those books were single entry ledgers we bought for 30 cents each to record this information in, and one loom fixer paid us $5.00 to copy one for him. Then the orders came in from section men, assistant overseers, and overseers faster than we could copy them. We employed another fellow and a young lady, to copy books for us.

This book business prompted some of the section men to ask us



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SIMPLIFIES OPERATING and CUTS COSTS

The new Gessner Open Decating Machine embodies important new time and money-saving principles. In fact, Gessner Open Decating has become a one man operation in an ever-growing number of mills. Gessner improvements include tension controls for the decating apron, which prevent apron slap even at high speeds and which greatly lengthen the life of the apron. Mechanisms control the firmness of the decating roll without added tension on the apron. The Gessner Open Decating Machine may be equipped with a platform and guides to unload cloth in folds back on to the truck.

DAVID **Gessner** COMPANY

WORCESTER 3, MASSACHUSETTS

to start a night school. The superintendent was interested enough to let us have an empty house free of rent, and we bought a load of pine slabs for a dollar to make seats. We charged 10 cents for each pupil per night, and did we have fun.

Well did we remember how hard it was for us to memorize rules of arithmetic when we were in school, so, we decided in teaching these section men and weavers we would try our best to make rules which would be easily remembered. For example, as well as we can recall, (we do not have access to an arithmetic book at the moment to check)—the rule for division of fractions was "Invert the divisor and proceed as in multiplication, etc."

We told the boys in our night classes to "Turn the one you are going to divide by *upside down* and multiply." Well, it worked. That is, the boys would not forget that "upside down" rule. This was our problem in teaching arithmetic —to make it easy to remember rules. In decimal fractions, our plan of making rules the boys could remember was especially effective.

Now why has OLD-TIMER taken up your time in reading such an unimportant experience? Here is why. OLD-TIMER learned a lesson that every man who works people should learn. We learned that if you want people to follow you, you must know how to talk their language. You must know how to use language (words if you please) which will not only appeal to *their way* of reasoning, but language that they understand and will remember—Reasoning which will register in their subconscious minds and *stay there* when some trouble maker is trying to get them to think his way.

This was a lesson we not only did not forget ourselves, but we have used that fundamental principle in every position we have ever held and found it brought results in talking to the sweeper, the oiler, the roving hauler, the spinner, the weaver, the section man, or even overseer, superintendent, or the *president* of the mill. OLD-TIMER probably had never used or even known the meaning of the

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DESIGNED TO FIT the needs of the industry, this textile roving truck has a variety of uses in any plant. Sturdy and rigidly reinforced for hard daily usage and long service . . . *there just isn't anything better.*

ALL SIZES to fit any requirement . . . side construction reinforced by 1, 2 or 3 ribs. Cadmium plated round corners protect plant walls, machinery and the truck itself. Standard bottoms of either slatted or solid hard pine.

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Built in Several Sizes for Eliminating Manual Lifting

They have both the handle and foot operating lever which makes the operation much faster. They are the answer to many of your problems in textile and finishing; also paper plants and many other industries; you get lifting and transportation in one unit.

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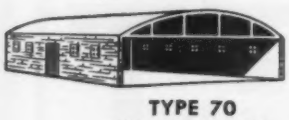

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word psychology at that time, but he did have some ideas about human nature, and psychology and human nature are pretty close kinfolk, you know. One more illustration about arithmetic and we will pass on to something else.

When we got into cotton mill and machinery calculations we discovered that it was rather difficult for the boys to understand about draft, twist, or other constants. They seemed to feel like constants were something the machinery builders gave you. None of them had ever tried to figure out a draft constant or any other constant. Well, instead of trying to explain a long chain of drive and driven gears, diameter of front roll times 3.1416, etc., we selected loom production, because of the few figures involved it was easier to explain.

For example, 160 picks per min. x 60 min., hr. x 40 hrs. per week (it was 55 hrs. then) divided by 80 picks per inch x 36″ yard = yards production per week. Only five items of figures were involved. Therefore, most of the students, or pupils we suppose is the more appropriate word, could easily understand the simple calculation thus:

$$\frac{160 \times 60 \times 40}{80 \times 36} = 133.3 \text{ yds.}$$

Now we would ask them: What do you change when you change the production of a loom? Most of them would quickly answer: change gear or pick gear (as the gear is more often called). OK. Now if changing the pick gear changes the production of a loom, all you need to do to make a production constant is leave the pick gear out of the calculation like this:

$$\frac{160 \times 60 \times 40}{36} = 10666.$$

This figure is your loom production constant because you have left the pick gear out. Now take this constant and put the pick gear back in and you have yards per loom. Thus: $10666 \div 80 = 133.3$ yds.

Also, if you want the production of 40-pick goods, just use your constant 10666 and divide by 40 picks which will give you 266.6 yards. Now, they understood how

to make a constant for anything. If you want a draft constant just leave the draft gear out of the colculations.

OLD-TIMER once gave a young textile graduate a section of looms and told him if he would follow our instructions explicitly, that in a few months he would not be working more than 60% (exclusive of tying on warps) of his time to run that section, and his production and supply cost would be along with the best. He was a good pupil—he followed instructions and our predictions were fulfilled.

We took this young man off of a section of looms and made him overseer of a card room containing over 400 cards. Again we pledged him to follow instructions. He did. Today he is general manager of a large textile firm. The editor of TEXTILE INDUSTRIES knows him and also personally knows about the foregoing circumstances.

Gentlemen, must we repeat and keep on repeating and giving you actual experiences to prove to you that if you expect to be a leader of people you must know how to talk their language—think the way they do and be a student of human nature, sufficiently mixed with a good supply of old common sense?

Think back over what OLD-TIMER has told you in this and previous articles. Does it take a man with advanced college degrees to understand the simple facts we have related to you? Do you realize the experiences we have given you are facts, not fiction? Then why in - - - - ?

Oh! Yes! We have also learned in our long experience that human nature takes some freakish turns—that there are many things the psychologists have not been able to explain. Well, one of those things is that some human beings simply will not profit by the experience of others.

Of course calculating machines have taken most of the glamour away from the fellow who thought he was rather smart with figures. Still, OLD-TIMER believes there are some things pertaining to an overseer's or superintendent's job which he should figure out and memorize for quick information.

For example: Years ago the common parlance was that a customer wanted so many pieces (60 yds.) of cloth per week or for his complete order. One day our boss phoned from Worth Street, New York, "Mr. Blank wants 400 pieces of 80 x 80 per week. How many looms will it take?" 210 looms, sir. "When can you start deliveries?" We can give him 100 pieces in a week and then 400 pieces per week.

You see how simple it was, fellows, because we had figured out constants for all goods we were likely to make from 20 to 80 picks, allowing of course for seconds, shorts and remnants, and had these constants in a note book we carried in our pocket. In time you get where you remember most of them.

If you are as observing as you should be, you will know many things you will be asked about

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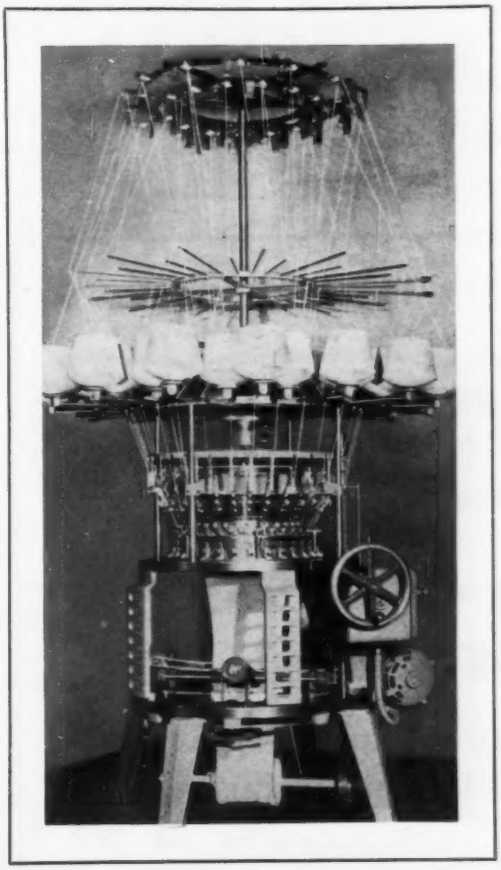
20" DIAMETER 30 FEED EDMOS

Type EEM Super Multi Feed Plain Rib Body Machine



FOR YOUR HIGH SPEED KNITTING NEEDS—The new Edmos type EEM, with 1½ feeds per diameter inch, has proven it can produce up to four times more work than older type machines—all within the same floor space! Especially designed for the manufacture of fabrics in the Swiss rib family; ideal for the production of quality fabric for "T" shirts, polo shirts and basque shirts.

See a demonstration at the Edmos plant.

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from time to time. Therefore, if you are anxious to earn the money your employer is paying you, why not be prepared to answer his questions promptly and correctly. He will think more of you and you will have the pleasure of knowing you are "on the job."

Ideas on Job Loads. Here is one for the books. And come to think of it, (remember this was 40 years ago) the International Correspondence School did mention the truck we are going to tell you about in one of their text books on weaving. About 1905 a "J" model loom was put out to make 27″ print cloths, which were standard at that time. The loom was very light and had steel harnesses, which were also the stop motion (no drop wires). OLD-TIMER had argued with manufacturer's representative that we were not operating automatic looms properly to derive the benefit of the automatic part—that is the battery and stop motion.

We claimed that, theoretically speaking, when you walked into a weave room and saw weavers standing in the alley with batteries all full and waiting for a loom to stop, the mill was not getting the benefit of the extra money they had paid for battery and stop motion. Our theory was that weavers should have 25% *more* looms than they could run. Sounds foolish, (doesn't it?) that a mill intending to put in 1000 looms should put in 1250 and give the 1250 looms to the same number of weavers intended for 1000 looms. Oh! of course reduce the price 25% per cut, too. (This was before pick counters were used.) We claimed weavers would make more money per week and the cost per pound would be less for the mill simply because, as any overseer of weaving knows, those 250 extra looms would not be stopped all the time, and weavers would have something to do during the time they were waiting for a loom to stop.

Weavers Truck. OLD-TIMER went ahead and put weavers on 24 looms. Something never before heard of. The textile papers of Lancashire, England, published articles criticizing the Americans for putting operatives on more machines than any human being could run, etc. We saw some clippings of these articles, which put us to thinking—with the result that we devised a weaver's truck which ran on a track placed on the floor in the weaver's alley. The truck had a stool in the center for the weaver to sit on and a filling box on one end. When a loom stopped down the alley the weaver placed his hand on the loom, gave a shove, and down the alley she went. The truck was later patented. But, and but again, that was 42 years ago, gentlemen, and now weavers run 100 looms on light pick and sley goods, and OLD-TIMER's truck is not worth a darn.

Old-Timer's Early Predictions. It is really a little embarrasing to relate some of the methods of management we and superintendents had 40 years ago. To give you

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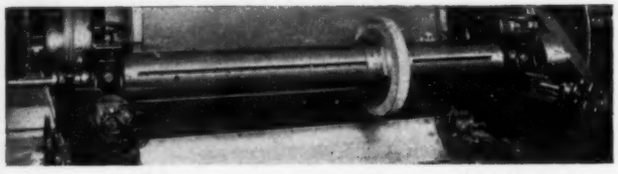

Grinding cylinders before clothing or redrawing eliminates excessive grinding of newly applied wire . . . insuring uniform carding action.

Card clothing manufacturers finish their cylinders on this machine.

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Dallas, Tex.	Textile Supply Co.	Tel. 7-4729

some idea as to what we are driving at we wrote an article over 40 years ago which was published in "Cotton" (TEXTILE INDUSTRIES) concerning the future cotton mill. This was many years before the OLD-TIMER page was started in March 1922. In that article we made some rather drastic predictions. That is, they were considered so drastic at the time that many readers said we were dreaming.

One prediction was that cotton mills would be built, sometime in the future, without windows which could be opened, because those mills would have some way of controlling temperature and humidity inside the mills. Another prediction was (and it was considered by some readers as more drastic or impossible than the first one) that mills would find a way not to beat cotton so much in the cleaning process. We had three processes of pickers at that time, you know. And as we had just put weavers on 24 looms weaving 27″ print cloths, which was equivalent to about sixteen 40″ looms, no one dared to predict that weavers would ever run more looms than that. Goodness no!

Overcoming Labor Shortage. Another phase of running a cotton mill in those days of 5-cent cotton which we brilliant (??) overseers and superintendents had to battle with was the labor problem. Mills were being built pretty fast, and with nuemrous other conditions at that time there was simply not a sufficient number of operatives for all the mills. It was "dog eat dog," so to speak, as to who could hire the most of the other fellow's help.

For example, when one mill was built in South Carolina in the late '90's, the president of the mill sent men out to recruit unskilled workers from farms and cities. They were brought in by passenger carloads. All of such help had to be trained, of course, and, boy, it was some mess!

Naturally OLD-TIMER was rack-

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DOUBLE CARDED

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HIGHEST QUALITY
DOUBLE CARDED
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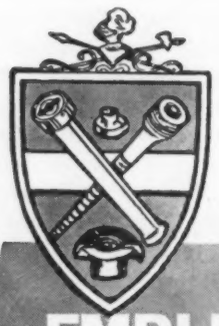

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Insist on Anderson when you order metal shields.

TEXTILE SHIELD CO., INC.

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ing his brain to think of ways and means to solicit operatives from other mills. One of our most successful schemes was an idea we conceived during an election year. Lapel buttons were put out by political candidates with their photo on the button and the office for which they were running. We had lapel buttons made showing the loom, and printed around the margin was "Blank Mill's Weaving Runs Well." We arranged with the post office to let us pin one of these buttons on one end of a card with a stamp on the opposite end and addressed these buttons to all the weavers we could get the names of at other mills.

Sometimes we would put a man on the train and as he passed through towns where there was a cotton mill, he would throw out hands full of buttons as the train started off. You can no doubt guess what our idea was. Well, we reasoned somewhat like this: In, say twenty cotton mills, there would be some weavers who would quit each day or week, without having in mind any certain mill they would go to. Maybe the weaver got mad and quit without thinking anything about where he was going. Does it not stand to reason then that the more weavers that we could plant the name of our mill in their brains, the more weavers would come to our mill. Yea! It worked pretty well, even if OLD-TIMER did have to pay for all those darn buttons out of his own pocket.

We also used post cards and other schemes to induce people to come to our mill. We are wondering if you modern textile operating executives realize what we old fellows went through and how hard we had to work to compete with other men in running our jobs—at the same time having to make our own sizings, our own soaps, our own belt cement, etc. Maybe you young overseers and superintendents of today think we old timers had an easy time back in those days, with no unions, no labor laws, etc. Oh well! Maybe so, but some of the experiences narrated do not seem to substantiate your belief.

Smilin' Tex says:

"IT AIN'T BRAGGIN' IF YOU CAN PROVE IT"

In Texas your taxes are as low as — or lower than — any place in the U. S. A.

They say there are two things no man can escape — death and taxes. That's true. It is also true that in Texas you pay the minimum in the way of taxes, for the Lone Star State has *no sales tax, no State income tax*, but on its statutes there is a *community property law.*

To the friendly tax laws (or lack of unfriendly ones) can be added many other reasons why you should build your textile plant on the Texas Gulf Coast. Here are a few:

Of the total U. S. yield Texas produces 28% of the cotton, 21% of the wool and 84% of the mohair. The synthetics industry is rapidly expanding in Texas.

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Plus: rail, water, highway and air transportation to all markets, domestic and foreign; intelligent, cooperative workers; an abundance of pure water; and a climate that's inviting the year round.

Send for a Survey of the Texas Coast Country. On request, we will prepare for your company a carefully engineered and confidential survey of the Texas Coast Country individualized to fit your particular problem. No cost, no obligation. Address Research Department, Houston Pipe Line Company, Houston, Texas.

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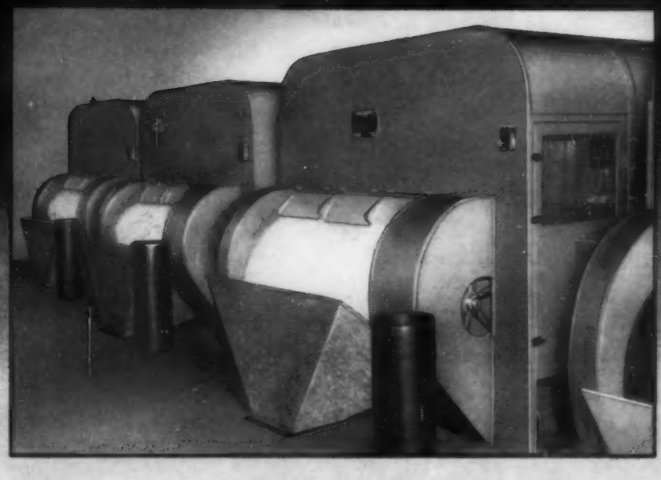
NEWS in BRIEF

Military Orders Will Reduce Civilian Production. Any increase in orders to meet military requirements will mean immediately reduced production of civilian wool textiles, according to Charles F. H. Johnson, Jr., vice-president and general manager of Botany Mills, Inc. The wool textile industry is running at maximum capacity at present to meet civilian orders on hand, and there is an acute shortage of the types of wool needed to fill orders. Emphasizing that military textile requirements must await the action of Congress, Mr. Johnson pointed out that of the total amount of wool required to fill Army orders alone for the fiscal year of 1940 to equip 1,500,000 men and provide partial reserves for 800,000 men on a peacetime basis, 146,000,000 pounds was in qualities of from 60s to 64s which are in such scarce supply today that civilian production is hampered.

Employers Advised Not to Accept Substitutes for Closed Shop. Employers are being urged to refuse all union suggestions to evade the closed shop ban, as contained in the Taft-Hartley Law, according to negotiation specialists of the Labor Relations Institute, New York. Pointing out that some employers have accepted union proposals for getting around these sections of the law to avoid disrupting relations, the Institute states that such settlements should be recognized as exposing management to the dangers involved in making such evasive contracts. Two of the dangers were listed as follows: (1) The agreement may be challenged by workers or job applicants who claim that they have been discriminated against because of lack of union membership. (2) An illegal union security agreement will be no defense against unfair labor practice charges filed by them with the Board. If any agreement is found illegal by the Board, not only will the employer be found liable along with the union for back pay, but the Board may order the employer not to deal with that particular shop provision in expiring contracts that cannot be renewed. The union shop is the maximum form of union security allowed under the law. It can be granted by an employer only after members of the bargaining unit in an NLRB election have authorized the union to make this demand.

Hospitals Steady Market for Cotton Products. More than 112,000 bales of cotton are consumed annually in the manufacture of cotton products for hospital and medical supplies, according to a recent survey by the National

DRYERS BY SARGENT



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Hubert Davies & Co., Ltd.
Port Elizabeth, South Africa

Cotton Council. The following compilation, based on 1946 figures provided by the American Hospital Association, shows the hospitals' approximate annual requirements of cotton supplies: Adhesive rolls, 213,179,100; bandage gauze (five-yard rolls), 568,477,600 rolls; gauze (100-yd. bolts), 284,-238,800 bolts; gauze (iota form, five-yd. jars), 17,054,328 jars; gauze (plain, five-yd. jars), 17,-054,328; cotton balls (cartons of 2000), 71,059,700 cartons; sheet wadding (sheets), 213,179,100; sheet wadding (dozen), 28,423,880; stockinets, 2,842,388 bolts; suspensories, 17,054,328; tourniquets 2,131,791; webbing (one-inch rolls), 2,842,388 rolls.

Fabrics Made from Koroseal Covered Yarn. A variety of fabrics made of yarn covered with Koroseal film is now available, according to a recent announcement by The B. F. Goodrich Co., Akron, Ohio. Porosity and excellent hand are among two outstanding qualities claimed for the new fabrics. They can be sewn or heat sealed, with the sealing bond as firm as that obtained on any Koroseal film. Fabrics are being offered at present in black and white and nine pastel shades. Present production is limited to fabrics with glass yarns as the core. However, other multi-filaments, including nylon, rayon, cotton, silk, and wire can and will be used, according to the announcement. Yarns for the new fabrics are made by the Tensolite process which differs from other methods by applying the film parallel to the core, instead of spirally around it, allowing centering of the core with no thin spots which might wear more rapidly than others.

All Pacific Shirting Fabrics Made Washable. As a result of satisfactory consumer experience with washable wool shirts, the Worsted Division of Pacific Mills has announced that its entire output of worsted shirting fabrics for 1948 will be treated with the "Pacifixed" shrink resistant process. Pacific Mills, it will be recalled, introduced a tropical worsted shirting in 1947 subjected to its new "Pacifixed" shrink resistant process which made it washable. Shirts of this fabric were nationally distributed and careful check was made of their performance under laundering. So satisfactory have been the reports that Pacific for the 1948-49 season is introducing a fine worsted gabardine fabric to augment the tropical worsted.

Consumer Survey on Fabrics. A recent survey by New York University indicated that a large majority of retail customers want to know certain facts about fabrics. The customer wants to know if a fabric will shrink, and if so, how much; also information is desired on how to care for the fabrics purchased.

Council Changes Annual Meeting Date. The National Cotton Council will hold its eleventh annual meeting at Los Angeles, California, next March 7-9, Harold A. Young, North Little Rock, Arkansas, Council president has announced.

The Council originally had announced that its Los Angeles convention would be held November 29-December 1, but at their recent spring meeting the board of directors of the organization voted to set the date for next March.

"The board determined that the early spring dates would be more satisfactory to the majority of the Council's membership," Mr. Young said. The convention is expected to attract more than 1,000 cotton industry members, representatives of allied industries, the U. S. Department of Agriculture, land grant colleges, and other groups.

Hand-Knitting Yarns of Nylon. Nylon hand-knitting yarns for sweaters and socks, made of 100% nylon staple, will be placed on the retail market in the near future by James Lees and Sons Company, Bridgeport, Pa.

These nylon staple yarns have a wool-like appearance. They are soft and warm and have a pleasing luster, according to the announcement.

TON TEX
Reg. U.S. Pat. Off.

GENUINE TON-TEX
LOOM HARNESS STRAPPING

Operates Better — Lasts Longer

Genuine Ton-Tex is made of plies of fine quality cotton fabric welded together. Balanced construction. Strong, flexible, absorbs shock easily. Operates at low maintenance cost.

For the Best in Strapping — Specify Ton-Tex.

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GREENSBORO, N. C.
124 JEFFERSON BLDG.
BOSTON 10, MASS.
122 PEARL ST.

AN

EXECUTIVE VIEWS

THE NEWS IN TEXTILES

This department is prepared by a man who is closely identified with the textile industry.

Competition

During the past year the American textile industry has become more "internationally minded" than ever before in its history. Representatives of the industry have been to Japan, England and other countries, and individual manufacturers have kept a much closer watch for possible foreign markets.

Not many years ago most mill men lost interest in their product when it left their shipping platforms, but that is no longer the case today. Most of us have come to understand that one of these days the domestic market is going to reach the saturation point and that the logical answer—and perhaps the only answer—is to develop foreign outlets.

But prior to Pearl Harbor we had seen foreign markets pretty well dominated by Japanese and British traders and many of us are wondering how long it will be before competition from the low-wage areas of the world will make it difficult, if not impossible, for us to sell our goods abroad. We also wonder how long it will be before the "free traders" lower tariffs to such an extent that we may be in danger of losing a good part of our domestic market.

All these fears are sensible ones, well-grounded on a basis of what has happened in previous years and upon an understanding of the current political philosophy. It has been noted before in this column that in the month of April, 1937, the Japs sent more goods into the United States than in the entire nine-year period, 1926-1934. No manufacturer interested in the future of his mill can or should forget that all the emphasis today is on lowering or wiping out tariff walls. The proposed International Trade Organization—the ITO—would set up an international "bureau" to do just about that, among other things.

And so with these things in mind this question naturally arises: *What can we do about it?*

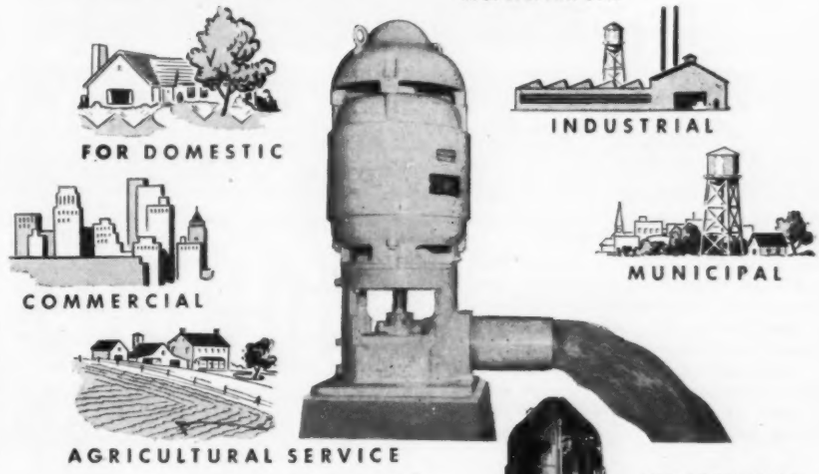
Productivity

One thing we *could* do would be to fight for a retention of tariff walls with regard to textile products. But even if we succeeded, that would not help us to hold what foreign markets we have, nor would it help us to expand our foreign markets. Most of the heavy industries in America, having little to fear from foreign competition, prefer to see tariff walls lowered in this country and in all countries because that will aid them in selling farm machinery, automobiles, etc., to the Spanish, the Chinese, the British, and to those who came out on the so-called losing end of the recent conflict.

It is rather doubtful that efforts to maintain a high tariff would meet

PEERLESS HI-LIFT

REG. U. S. PAT. OFF.



The low cost pump for developing a maximum water supply from small diameter wells

Here is one of the most simple and most positive of all deep well water pumping systems. The HiLlift pump has almost universal application because it's easy to understand, install and operate. In the Hi-Lift, Peerless utilizes an ingenious pumping element to literally squeeze water upward. Its pumping element consists simply of a hard chrome helically contoured rotor revolving in a similarly contoured rubber stator. That's all there is to this positive Peerless method of water lifting. It's the most forward step in pumping developed in the last 10 years, proved by thousands of successful installations in all kinds of service.

Peerless Bulletin B-142 fully describes and illustrates the many advantages of the Hi-Lift Pump. Write for your copy today!

CAPACITIES: 600 to 3300 Gallons per Hour from well depths to 600 feet.

Hi-Lift's pumping element is water lubricated, operates at half the usual pump speed; resists sand cutting abrasion and corrosion. When used with pressure tank, extremely high pressure may be developed without change or adjustment. These and many other Hi-Lift features are sure to make big savings in your water supply costs.

FULLY PATENTED BY R. MOINEAU & PEERLESS PATS.

fmc PEERLESS PUMPS

PEERLESS PUMP DIVISION, *Food Machinery Corp*

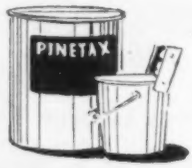
LOS ANGELES 31, CALIF.; INDIANAPOLIS, IND.

District Offices: New York 5, 37 Wall Street; Chicago 40, 4554 No. Broadway; Atlanta Office: Rutland Building, Decatur, Georgia; Dallas 1, Texas; Fresno, Calif.; Los Angeles 31, Calif.

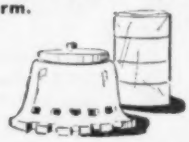
*
pretty to look at

but they don't
MAKE FRIENDS

*** Your premises may be modern . . . beautiful . . . and the last word in appearance, but if offensive odors come into the picture they just don't make friends for you. There's no excuse to let P. O. (Premise Odor) stifle your business . . . your relationship with people . . . not when P. O. is so simple to control with the proper Selig disinfectant or deodorant.**



With PINETAX, offensive odors that arise from unsanitary conditions are overcome at their source by eliminating their cause . . . other odors are relieved and staleness overcome by the fresh pine odor when Pinetax is used in mopping water . . . also may be used as a deodorizing spray in diluted form.



Only Selig offers you the patented features to be found in the URANETTE method of deodorizing your toilet rooms. The Uranette deodorant holder prevents clogging of drains, has no metal parts to corrode or rust and is pilfer-proof . . . protecting against the removal of Uranette blocks until their deodorizing vapors are completely used.

Ask for a Selig maintenance specialist to help you plan your sanitation program... there's a Selig product designed for better sanitation wherever it may be.

The SELIG COMPANY
Manufacturing Chemist since 1896
GENERAL OFFICES and FACTORY
ATLANTA • GEORGIA

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with much success in the face of what appears to be a concerted effort to lower existing rates. Certainly we can and we should demand of Congress that it move slowly, and only after hearing both sides of the question. We should tell our representatives in no uncertain terms that a precipitate downward revision at this time might spell disaster for the textile mills and for the jobs of hundreds of thousands of textile employees.

But all of that is negative, in a sense, and still does not help us with the foreign market. It might help us keep Czechoslovakian handkerchiefs from being sold in Lowell, Massachusetts, but it's not going to help us sell American print cloth in Lima, Peru. In the opinion of this writer only one thing is going to accomplish that: *to meet our competition on neutral ground and sell a better fabric at a lower price.* And the only way we know to do this, with wage scales what they are, is to increase productivity per man-hour to a point where we can compete with the low-wage areas.

The Way It Looks Now

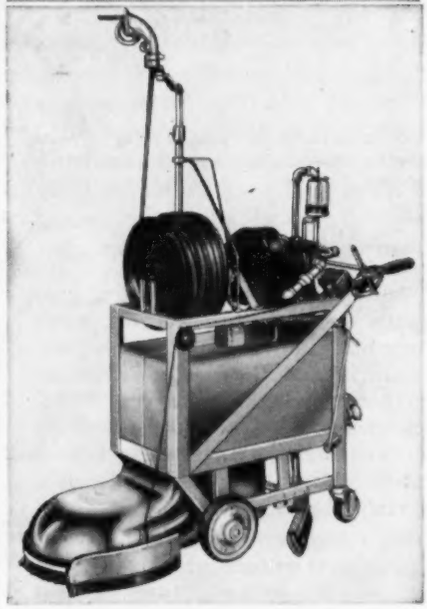
Frequently when management has talked this way in past years a great hue and cry has gone up, and the principal word heard in that turmoil has been "stretchout." By now, however, employer, employee and the public must have all come to realize that working conditions in the textile industry are so much better today than they were 20 years ago that no comparison is necessary.

The figures on productivity for the cotton broad woven goods industry, covering only the recent years, do not look quite so good, however. Figures of the Bureau of Labor Statistics, U. S. Department of Labor, show what has happened. Figuring productivity per man-hour as 100 per cent in 1939, the Bureau shows that this had dropped to 92.3 by 1946. Unit labor cost, reflecting rising wages, climbed from a base of 100 in 1939 to 227.9 in 1946. Those figures do not show that we are getting in a more strategic position from which to transact our share of the foreign business.

We are not concerned at the moment with what *caused* that decline in productivity per man-hour, because a number of factors must have entered into the picture. The important thing now is to correct the trend.

Let's not lose sight of the stakes involved in the game, because without keeping them in mind we might

SCRUBS and SQUEEGEES
FLOORS



LAWLOR 20-D
DOES BOTH JOBS

Only one operator is required to run this remarkable two-in-one machine. Clean water is fed from one tank upon the soaped floor, the 19" diameter revolving brush scrubs it quickly and thoroughly. Then a rubber squeegee mops up the dirty water which is vacuum pumped into a second tank.

JUST THE THING FOR LARGE AREAS

The Lawlor 20-D is only 22" wide and can be used in congested places around machines, counters and desks. Available for either AC or DC current.

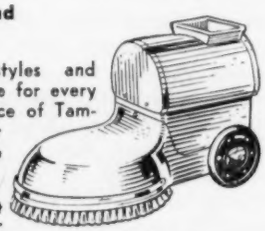
MOP WRINGERS

All steel with perforated rolls. Easy foot-lever operation. Made for one or two pails.

MOPPING TANKS

Heavy galvanized steel with welded seams. Two compartments, each with shut-off. Foot pressure wringers. 30 or 60-gallon capacity.

SCRUBBERS and POLISHERS



12 different styles and sizes, a right size for every need. Your choice of Tampico, Palmetto or Steel Wire brushes.

Lawlor Equipment is sold and serviced by local Janitor Supply Houses.

Write for Catalog giving description on the complete line

S. C. LAWLOR CO.
Makers of Quality Equipment for 50 Years
121 N. Aberdeen St., Chicago 7, Ill.

get the idea that the pot is not worth the necessary effort. In the calendar year 1947 we exported from the United States 1,500,000,000 square yards of "cotton cloth, duck and tire fabrics." That is quite a considerable amount of cloth, and many spindles and looms were kept busy producing it and many workers were employed in its production.

It is also important to note that exports of these classifications in 1947 were approximately 400 per cent higher than in 1939, the year World War II started in Europe.

Back to Productivity

To this writer, the whole thing comes back to the fact that we in America must find new and better ways of making yarn and cloth. We must have the best possible equipment; we must develop training programs for employees to make them more efficient than ever before; and we must have supervisors and top executives who know their jobs and who are capable of getting the maximum poundage of yarn from each spindle and the maximum yardage of grey goods from each loom.

Technologically, we must keep ahead of the world—and far ahead of it—if we are to meet the challenges of other nations. We have talked of cotton here, but the story is the same for synthetic fibers. Whether we obtain our raw material from the cotton field or from the forest, all down the line we must find ways to reduce costs. If the industry is to progress, both labor and management must work together toward this goal.

From the standpoint of foreign competition, it may be later than we think.

Utica Offers Course in Textile Technology

Geared to the present day methods of textile manufacturing, which results in an increasing demand for technically trained men, New York State has established a two-year course in textile technology at the Technical Institute in Utica, New York. The course includes a study of all natural and manufactured fibers, yarn manufacture, weaving, knitting, dyeing and finishing, designing, analysis, testing, cost and marketing.

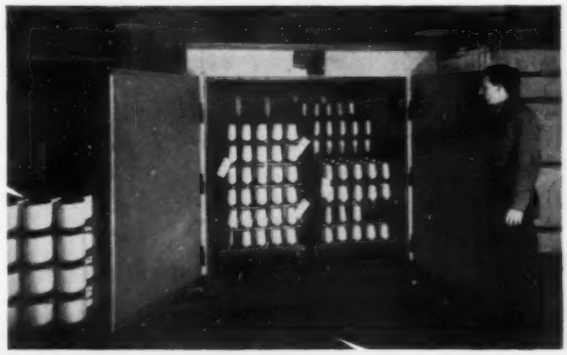
The course will combine theory with practice.

Series 2 of typical "H-W" CONDITIONER applications

SYNTHETIC YARNS, INC. (Mass.) *REPORTS*

*advantages of the *"H-W" CONDITIONER*

The successful service record of the "H-W" CONDITIONER in operation in the mill of Synthetic Yarns, Inc. (Mass.), Lowell, Mass., is evidenced by the following report from Mr. Victor A. Schiffer, Technical Director: "We find the 'H-W' Conditioner a good performer in holding uniform constant temperature and relative humidity conditions over a wide range of conditions, avoiding excess condensation. The timing device has been found helpful in reducing direct labor costs, as well as other costs. The boxes are of sufficient size to handle large workloads, yet are not oversize so as to result in waste space. The result is that we are able to apply the proper conditioning to each individual type of yarn. In a plant such as ours, where many types of yarns are handled, the feature of mobility is important."



View of "H-W" CONDITIONER installed in mill of SYNTHETIC YARNS, INC. (Mass.).

Full particulars in Bulletin UC-3 . . . yours for the asking.

*Trade-Mark Reg.

The Industrial Dryer Corporation
STAMFORD, CONN.

ECONOMY

IN TEXTILE MILL MAINTENANCE

FULLER TEXTILE BROOM LASTS 3 to 6 TIMES LONGER

Cuts Rising Maintenance Costs With labor costs mounting steadily the economy of longer-lasting cleaning tools provides the answer to keeping maintenance costs within bounds. The carefully selected fibers of the Fuller Textile Broom provide a durable sweeping surface that outwears 3 to 6 ordinary brooms. A light weight metal casing further increases the broom's life by protecting it from damage when sweeping under or around machinery. For true economy in *your* mill, make sure you get the Fuller Textile Broom.

TELEPHONE your Local Fuller Branch Office or write

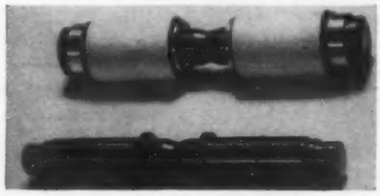
The FULLER BRUSH Co.
INDUSTRIAL DIVISION
3622 Main St. • Hartford 2, Conn.

In Canada: Fuller Brush Co., Ltd., Hamilton, Ont.

NEW EQUIPMENT
AND MATERIALS

Needle Bearing Top Roll

A new line of needle bearing top rolls has been developed by The Torrington Company, Torrington, Connecticut, for use in various positions on roving and spinning frames. These top rolls offer improved economy in action and contribute to higher quality roving and yarn, it is claimed.



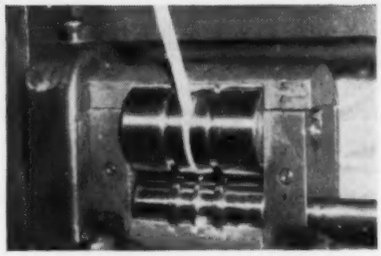
Torrington needle bearing top roll.

The new top rolls are compact units and are dimensionally interchangeable with other types of top rolls. Small OD in relation to bore of the needle bearings allows use of a large arbor which gives freedom from deflection, yet provides adequate cross-section for a durable shell and housing. The high radial capacity, derived from the large area of bearing contact surface, insures many years of service, according to the manufacturer.

Four rubber seals prevent the leakage of lubricant. A large oil reservoir between the two bearings in each boss allows many hours of operation before relubrication is required. Labyrinth seals are an additional feature which prevent the accumulation of fly or lint between the shell and arbor.

Lord "Shockmount"

The "Shockmount," recently announced by the Lord Manufacturing Company of Erie, Pa., is designed to control shock, isolate high frequency vibration, and reduce noise transmittance to the floor. It is a heavy duty mounting, with load capacities up to 7500 lbs. per mount.



Atlanta Machine Works, 98 Piedmont Ave., S. E., Atlanta, Ga., has announced the development of a grooved calender roll for cards which, it is claimed, will permit placing more sliver into a can without damage to the sliver or card. Other advantages cited are savings on bearing maintenance costs and power required to run the card.

The company claims that this new mount reduces the need for massive foundations to achieve inertia, and permits the placing of heavy machines where it would otherwise be impractical; also that the enervating noise of such machines as punch presses, textile machines, and printing presses is greatly reduced, with a consequent improvement of worker morale throughout the shop.

Rayon Handbook for Textile Mills

Rayon Technology, a handbook for textile mills prepared by the textile research department of American Viscose Corporation, has been published by the McGraw-Hill Book Company, Inc., 330 West 42nd St., New York 18, N. Y. ($3.75).

This book was prepared to meet the needs of mill men, teachers, students and others who want to know the way to process rayon into yarn, grey goods, and finished fabrics. It covers all phases of textile manufacture, including spinning rayon staple by the three principal systems, and throwing, weaving, knitting, dyeing and finishing.

New Aneroid Manometer

An aneroid manometer of stainless steel construction has been announced by Taylor Instrument Companies, Rochester 1, New York. The instrument was designed for measuring and controlling flow, liquid level, or specific gravity of those applications which involve caustics or acids such as sulphuric, acetic, nitric, and phosphoric.

The housing and all internal parts coming in contact with corrosive mediums are made of stainless steel. Because corrosive fluids can be introduced directly into the mano-

Air-sealed ELECTRIC WATER COOLER Conquers Atmospheric Handicaps

OASIS Model OP-10-W defies excess lint, dust, heat, moisture in mills, foundries

Ordinary electric water coolers often fail outright, or lose efficiency fast, *in the very plants that need them most.* Excessive heat, moisture, lint, dust or acid fumes cause them to bog down. But this specially air-sealed, heavily insulated OASIS, featuring a *water-cooled condenser,* defies such atmospheric conditions—it's always ready with fresh, clean, clear, *properly cooled* drinking water. Its rugged stainless steel top and heavy, rust-proofed cabinet are built for long, hard use. Available with easy-working dial-action bubbler or with glass filler (or both). See your OASIS dealer in the classified telephone directory, or send the coupon today!

The EBCO Manufacturing Co.
401 W. Town St., Columbus 8, Ohio

Please rush OASIS water cooler details to:

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FIRM
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QUALITY RICHMOND PRODUCTS

NO. 4 OF A SERIES

ATTENTION HOSIERY DYERS!

USE

ROSALAMINE - W

IN THE DYEHOUSE

A synthetic detergent and levelling agent coupled with buffers. It has many uses.

AS A SCOUR

It emulsifies and carries away oils, waxes and external dirt.

AS A DYEING AND LEVELLING AGENT

It retards dyeing just enough to help obtain level shades more evenly.

AS A PRE-BLEACH

It is useful on cottons and rayons.

AS A BOIL-OFF

It is used for silk because its buffering action tends to prevent chafing on silk, knitted and woven fabrics.

On ribbons, tapes, etc., either in hank or in jig dyeing, it gives better action because it opens the fibre for dyeing without deteriorating the fabric.

ROSALAMINE is made of two types, white and yellow. The yellow when used with direct or substantive colors saves as much as one-third of the dyestuff without saddening the colors. The white is used for bleaches or where yellow might not be advisable.

The use of ROSALAMINE is quite simple as the directions below indicate.

DIRECTIONS

All Percentages Based on the Weight of the Goods:

Use 3 to 5% of ROSALAMINE depending on the weight and kind of fabric.

This may be used for boil off and scouring and requires no rinsing.

If standing scour bath is used, simply lift out of the scour bath into the dye bath.

If a lot bath is used, it is advisable to flood the bath after boiling out or scouring and then go ahead and dye. ROSALAMINE may also be used in the dye bath as a leveling agent. In this case, 2% is advisable.

We will gladly aid you in the selection of the type to use, if you send us your problem.

Samples and More Detailed Information Upon Request

Southern Office
617 Johnston Bldg., Charlotte, N. C.
Charlotte 2-1428

RICHMOND OIL, SOAP & CHEMICAL CO., Inc.
1041-43 FRANKFORD AVE.
PHILADELPHIA 25, PA.

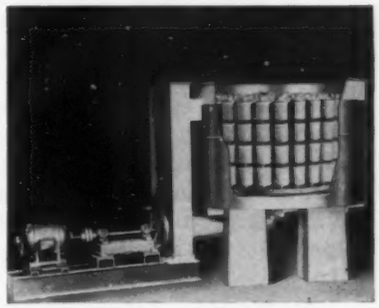
meter, no sealing fluids or purges are necessary.

The balancing agent is a torque tube to eliminate any need for liquid. The elimination of mercury prevents product contamination from this source.

According to the manufacturers, it is easy to clean because all areas are readily accessible. The unit is available in ranges of 20, 50, 100, and 200 inches of water differential with a body pressure rating of 300 psi.

Worsted Package Dyeing Machine

Standard Fabricators, Incorporated, 355 Walton Avenue, New York, N. Y., has announced a new dyeing machine, model Nuako, for worsted yarn in packages. This machine provides fast circulation of liquor at low pressure to prevent felting and channeling. The low liquor ratio permits economical dyeing. Machines may be operated singly or coupled together, each with a capacity of 250 pounds.



Package dyeing machine for worsted yarns.

The machine features stainless-steel construction and a specially designed removable material carrier for greater production.

"Kardex" Improvements

Design improvements in visible record equipment for business control systems have been announced by the Systems Division of Remington Rand, Inc., New York. Trade-named "Kardex Imperial," the re-styled line retains the pockets with which visible bar chart signals may be used, and other basic features of the previous models, and several operating conveniences have been added.

These include shorter slides for easier access in posting entries to record cards, a new slide extension that makes insertion or removal an easy one-hand operation, and new pre-scored pockets that lie back flat

INVESTIGATE

the greatly improved

POST-WAR MODELS

of the

ORIGINAL HYGROLIT SYSTEM

for the exacting demands of the textile industry of tomorrow.

For over thirty years KEARNY has had the privilege of close cooperation with the leading and progressive textile mills of this country and abroad in solving their sometimes very much involved

YARN CONDITIONING PROBLEMS

KEARNY'S vast specialized experience in the field of yarn conditioning coupled with progressive thinking, outstanding engineering skill and scientific chemical "know how" resulted in the development of a

COMPLETE LINE OF HYGROLIT MACHINE MODELS

as well as a

COMPLETE LINE OF HYGROLIT CONDITIONING CHEMICALS

to meet the specific requirements of each individual mill.

THE COST OF HYGROLITTING

your yarn is negligible; it averages 35/1000 of one cent per pound of yarn processed.

FOR FURTHER INFORMATION

ask for illustrated folder No. 901A or let our local representative discuss your problems with you.

KEARNY MANUFACTURING CO., INC.

Originators of Chemical Yarn Conditioning

KEARNY, N. J. | GREENVILLE, S. C.
Antwerp | Mexico D.F.
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Chicago - Whitehall 1334
Detroit - Randolph 2992
Dallas - Central 6415

Call the Railway Supply plant or sales office nearest you for full information and price quotations. Whether you are a producer or a user of Rayco Cotton and synthetic waste or linters, our eleven contact points assure you of quick, convenient action. Feel free to call upon us at any time—our fiber experts and four government licensed graders are always at your disposal.

The RAILWAY SUPPLY & MFG. CO. and Affiliates

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RAYCO

FOR COTTON
LINTERS
WASTE
SYNTHETIC WASTE

the first time used without need for "breaking in."

Overall construction embodies lightness and strength. In all models, doors may be substituted for the top slide and locked to prevent unauthorized reference.

Monel Roofing

A new type of monel sheet for roofing purposes has been developed by The International Nickel Company, Inc., 67 Wall St., New York, N. Y.

It is estimated that roofs made of the material will last over 100 years, the announcement said.

Textile Auxiliary Equipment

(*Continued from page* 324)

forms. By properly amplifying the steady impulses and harnessing them, means is afforded to provide a constant moisture content for such operations as slashing and tenter drying.

Drop wires on loom warps and stop motions on spoolers, warpers, knitting, and other machines that operate with an electronic relay give more positive protection than is possible with the old low voltage relay system. The electronic scheme requires that the drop wire handle only a few millionth part of an ampere so that burning or pitting of contacts is impossible. It also allows a dirty contact point to function properly because protection will be provided even though a contact resistance of as as high as 50,000 ohms is present.

The electronic relays also afford protection where the impulse provided to drop wire or other control contact is of extremely short duration. The electronic relay will function positively from an impulse lasting several micro seconds, which is extremely important for such applications as bobbin transfer in looms, or needle latch protection in knitting machines.

By using a direct-current motor fed through a Mot-O-Trol electronic means of obtaining direct current from alternating current, it is a simple matter to get accurate speed control over wide ranges upon impulses from some controlling device. As an example, the core driven warper winds yarn from many spools in a creel onto the driven spool or beam. In order to wind the yarn at a constant tension it is necessary to change the speed of the motor that drives the beam as the diameter of the beam increases. This is done by properly utilizing the impulses of a tachometer generator driven from a measuring roll over which the yarn passes so that the speed of the driving motor constantly decreases as the diameter of the beam increases. Continuous and accurate control is obtained with a minimum of complicated mechanical apparatus.

The electronic motor drive provides a simple means for accurate speed control. For example, there are many applications in the textile industry where yarn or cloth is fed at a fixed speed and the requirements are to wind it onto beam or spool at constant tension. This requires that the speed of the beam motor decreases constantly as the diameter increases. Electronic control is readily employed so that the field strength of the wind-up motor is changed by the correct amount at all times so that the armature current of the beam motor stays constant, which means that the wind-up tension of the warp or cloth remains constant.

Electronic devices provide means of accomplishing almost any result. Care must be exercised in selecting jobs because it is comparatively easy to become over enthusiastic and assign duties to electronic devices that can be handled just as effectively by less expensive and less complicated apparatus. On the other hand, electronic apparatus has progressed so tremendously that it has become simple, reliable industrial apparatus. Tube life is now measured in thousands of hours. Tubes can now stand overloads and abuses that were unthinkable just a few years ago.

The general acceptance of electronic devices has rightfully been slow because of high first cost, expensive maintenance, and complicated designs. These obstacles no longer exist, and electronic devices of many kinds for many applications are now being used with an ever increasing satisfaction and popularity.

PERSONAL NOTES

ABOUT MEN YOU KNOW

EDWIN C. PEASE, former assistant sales manager of the carpet division, has been appointed director of promotion and research by James Lees and Sons Co., Bridgeport, Pa.

Miss JEAN BLACKBURNE, former fashion co-ordinator for B. Altman and Co., New York, has joined James Lees and Sons as merchandise co-ordinator for Columbia and Minerva handknitting yarns.

JAMES C. SELF, president and treasurer of Greenwood (S. C.) Mills, has been named "Colonel of Industry" and "Honorary Citizen of the City of Greenwood." The honor was conferred by the city council in a resolution which cited Mr. Self's "philanthropic work, his industrial developments and innumerable civic achievements and gifts to his community and the city of Greenwood."

S. L. LEWIS, JR., general sales manager of the Eagle & Phenix Division of Fairforest Co., a subsidiary of Reeves Brothers, Inc., has been elected a vice-president of Reeves.

Mr. Lewis.

HARRY GEISBERG, former assistant to the superintendent, has succeeded H. S. REDMAN as superintendent of Louisville (Ky.) Textiles, Inc.

DAVID S. BALL has been appointed purchasing agent of the Harden Mfg. Co., and has been transferred from Rock Hill, S. C., to the main office in Gastonia, N. C. Mr. Ball succeeds ROBERT H. HOOD, resigned to become associated with his father-in-law in the operation of the Keesee Belting Co., Inc.

R. R. KOCH, former sales manager of the Portland, Ore., branch, has been appointed manager of Chase Bag Company's newly acquired Los Angeles plant.

WAYNE J. HOLMAN, JR., former general manager of the Lumite Division, has been named vice-president and general manager of Chicopee Sales Corp. He succeeds HARRIS M. McLAUGHLIN, retired.

Mr. Holman.

S. H. ELLIOTT, former manager of the Delta Finishing Co., has been named president of the newly-formed Delta Co., Inc., finishing plant in Philadelphia which is a subsidiary of J. P. Stevens & Co., Inc.

ROBERT W. HUGHES has resigned his position as group manager with Burlington Mills Corp., and has become production manager and general superintendent of Acme Hosiery Mills, Inc., Asheboro, N. C.

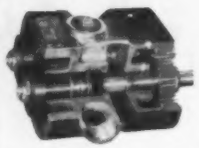
PAUL B. BRINE, representing Eagle & Phenix Mills and Columbus Mfg. Co. from 1941 to 1947, is now representing Reeves Brothers, Inc.,

Mr. Brine.

For Over a Quarter of a Century
STODGHILL and COMPANY
ATLANTA GEORGIA
has supplied the South with
"The Size That Satisfies"

THOMSON PUMPS

FOR PUMPING SIZE TO YOUR SLASHERS



GIVE EXTREMELY SATISFACTORY SERVICE

Thomson Pumps are positive rotary type. Note the crescent shape rotors in the cut-away view, and you'll see why there is no metal-to-metal contact within their pumping chambers. It's a simple, efficient design and construction that means long life, dependable performance and satisfactory service.

POSITIVE ROTARY TYPE

The lower cut-away view shows the rigid bearings, spring loaded seals and inverted rotor hub. All bearings and timing gears run in oil to assure continuous lubrication of the pump without contamination of the size and the pump lubrication.

LOW COST OPERATION

Shaft leakage and shaft friction are reduced to a minimum by the pumps being equipped with spring loaded seals.

NO JAMMING OR CLOGGING

THOMSON Pumps have positive volume control, self-priming and constant delivery, without agitation within the pumps. Capacities from 5 to 150 G.P.M. THOMSON Pumps are now successfully pumping size to slashers in many mills throughout the country.

NO METAL-TO-METAL CONTACT

SPRING LOADED SEALS

NO SHAFT LEAKAGE

NO CONTAMINATION OF SIZE

Write for complete information today.

DESIGNED AND MANUFACTURED BY EXPERIENCED *Engineers*

THOMSON PUMP DIVISION
WATEROUS COMPANY
ST. PAUL 1, MINN.

Waterous Dependable
SINCE 1886

in the New England states, with headquarters in Boston, Mass.

JOSEPH H. AXELROD has succeeded C. F. BROUGHTON, now chairman of the board, as president of Wamsutta Mills, New Bedford, Mass.

PAUL A. BARKER, former New York representative of Clifton Yarn Mills, Inc., has formed a new corporation to be known as Paul A. Barker Textiles, Inc., mill selling agents, and is located in New York City.

ZEB V. SIMMONS, former general overseer of weaving at Hoskins Mill No. 1, Charlotte, N. C., has joined Borden Mills, Kingsport, Tenn., in a similar capacity.

F. W. SYMMES, chairman of the board of Union-Buffalo Mills, Co., president of Piedmont Plush Mills, and president and treasurer of Nuckasee Mfg. Co., has been elected to the board of directors of United Merchants & Manufacturers, Inc.

Obituaries

EDWARD S. JENKINS, president of M. W. Jenkins' Sons, Inc., died recently at his home in Essex Fells, N. J., at the age of 59.

LOUIS J. COLAIANNI, SR., 54, general manager of Allied Textile Printers, Inc., Paterson, N. J., passed away recently.

MORRIS M. BRYAN, SR., president of Jefferson (Ga.) Mills, died recently in Atlanta, Ga.

W. A. McCANLESS, 67, president of the Halifax Cotton Mills, South Boston, Va., passed away recently in Salisbury, N. C.

WILLIAM HAROLD GIBSON, superintendent of Martha Mills, Thomaston, Ga., died in Gastonia, N. C., recently at the age of 63.

H. A. DINWIDDIE, vice-president and treasurer of Charlottesville (Va.) Woolen Mills, passed away at the age of 69.

PAUL E. WALDER, plant superintendent of the Kingston division of Duplan Corp., passed away recently following a month's illness.

HARRY LEE CORNELIUS, SR., 59, retired purchasing agent of Celanese Corp. of America, died in Cumberland, Md., recently after an illness of 10 months.

WHAT THE TEXTILE MILLS ARE DOING

The physical properties of the Stonewall (Miss.) Cotton Mill have been acquired by Erwin Cotton Mills Co., Durham, N. C. The purchasing company plans an extensive modernization of the Stonewall properties, and considerable new machinery will be installed. M. Ray Harden, now superintendent of the No. 4 plant in Durham, will be transferred to Stonewall as manager.

For totaling 588,000 man hours without a lost-time accident, employees of the Continental Mills' cloth room, Lewiston, Me., have received the Certificate Award for Safety Record from American Mutual Liability Insurance Co.

Textron Incorporated has purchased all the assets of The Esmond (R. I.) Mills, Inc., blankets, robe cloth, and napped fabrics, in exchange for 139,508 shares of its $1.25 convertible preferred stock and the assumption by Textron of all Esmond liabilities. Esmond properties include mills in Esmond; Waynesboro, Va.; Dover, N. H.; Granby, Quebec, and Perth, Ontario. The operations of Esmond Mills, Inc., will be carried on directly by Textron Inc. through an Esmond Mills Division. The subsidiaries will continue to operate as separate corporations. A later report states that Textron plans to sell part or all of Esmond Mills' manufacturing assets now.

Pacific Mills has been presented the fourth annual Flower Advertising Award by the Society of American Florists for the best use of flowers in the illustration of a national advertisement.

The United Piece Dye Works, New York, N. Y., has published a 16-page

$100 for Best Kink or Short Cut

(Ends August 10, 1948)

ONE HUNDRED dollars will be awarded the contributor who furnishes the most helpful short cut, kink, time-saving device, cost-cutting suggestion, or quality improvement idea by August 10. The contest may be entered by any reader of this magazine, but the kink must not have been published elsewhere.

In sending in ideas, give complete description and where possible accompany description by sketch. Finished drawings are unnecessary. Participants are not restricted as to number of kinks submitted for consideration.

Only one award will be made, but non-winning contributions will be paid for at regular rates if used. Advise in original correspondence if participant's name may be used, or if contributor number is preferred.

All entries must be postmarked not later than midnight of August 10, 1948. Address: Editor "Textile Industries," Grant Building, Atlanta, Georgia.

booklet entitled "United Finishes at Work," which describes and illustrates the steps in dyeing, printing and finishing rayon fabrics. Photographs of processing equipment models, especially built by United, provide close-up views of important finishing operations; examples of United's special finishes are shown by means of fabric swatches.

F. W. Warrington Co., Charlotte, N. C., has announced the purchase of fourteen washers by Dan River Mills, Danville, Va.; the purchase of a complete bleaching range including four washers by Appleton Mfg. Co., Anderson, S. C., and one washer by Hartsville (S. C.) Print & Dye Works.

Carlton Textile Corp., Fall River, Mass., has been chartered with a capital of 500 shares of stock, no par value, to manufacture cotton and rayon specialties. George Shenkman, Fall River, is president.

Long Island (N. Y.) Processing Corp., operating a dye works for cotton yarns, etc., has acquired an adjoining one-story building, and will occupy for expansion.

Alpha Corp., Gastonia, N. C., has been incorporated with a capital of $100,000, to operate a mill for the manufacture of cotton and other textile fabrics. Will Long, Sr., and Fred Upchurch, both of Gastonia, are the incorporators.

Delaine Worsted Mills, Inc., has been chartered with a capital of $130,000 and 150 shares of stock, no par value, to operate a worsted mill in the vicinity of Gastonia, N. C. Milton Tager, Gastonia, is the principal incorporator.

Ground has been broken for a one-story mill to be occupied by Laurel Hill Corporation at Rutherfordton, N. C., for the manufacture of cotton and rayon fabrics.

Hart Cotton Mills, Inc., Tarboro, N. C., has authorized an expansion and modernization program at the mill to include the installation of additional equipment for increased capacity. An air-conditioning system will be installed, fluorescent lighting, and 130 employee dwellings will be constructed. The entire project will represent an investment reported to be in excess of $2,000,000.

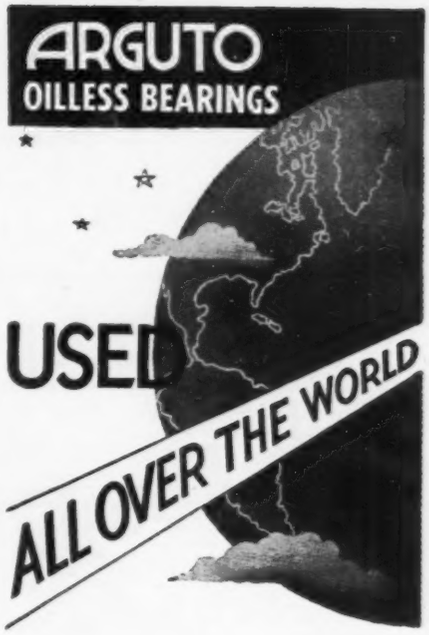
Royal Cotton Mill Co., Wake Forest, N. C., has begun an expansion program, to include the installation of about 3165 spinning spindles, 1920 twisting spindles and other equipment.

Artloom Corp., Philadelphia, Pa., carpets and rugs, has arranged for a change of company name to Artloom Carpet Co., Inc.

Cable Electric Products Co., Brooklyn, N. Y., has purchased Elmwood Mills of International Braid Co., Providence, R. I., from Crescent Corp., Fall River, Mass. Another line of production will be used by Cable.

Burlington Mills Corp., Greensboro, N. C., has purchased a tract of land near Altavista, Va., heretofore owner by Pacific Mills, and will use as a mill site to be constructed sometime in the future.

Bigelow-Sanford Carpet Co., Inc., Thompsonville, Conn., has increased the estimate of proposed expenditures for mill modernization and expansion in 1948 from $3,000,000 to $5,000,000. A considerable part of appropriation is to be used for equipment purchases.



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Here is the "cream of the crop" of literature on textile subjects as prepared by TEXTILE INDUSTRIES advertisers to aid in mill operation and management. These reference books and catalogs are free for the asking and there is no obligation involved. Read through the list carefully for booklet on the subject or equipment in which you are interested. Then fill in the numbers of those desired on the detachable postage paid card on the following page and mail it to TEXTILE INDUSTRIES.

This service is restricted to those engaged in operation and management of textile industries

GENERAL ECONOMIC, MANAGEMENT . . .

4. HOW FACTORING CAN INCREASE PROFITS—Describes how factoring works out in keeping clients' capital liquid and attitude of factor toward checking credits, including typical balance sheet.—COMMERCIAL FACTORS CORP., New York City.

5. FACTORING AND FINANCING — Illustrated booklet on how factoring works, cost and credit information.—TEXTILE BANKING COMPANY, New York, N. Y.

7. RAYON TELLS ITS STORY TO THE PUBLIC—Folder containing reprints of advertisements explaining some of the many roles in which rayon is serving the American public.—AMERICAN VISCOSE CORPORATION, New York 1, N. Y.

9. TESTING IN MODERN INDUSTRY — This booklet includes many useful tables, conversion factors, equivalent yarn sizes and other information helpful in textile mills. Also describes specialized testing service. Available free to mill men on request.—UNITED STATES TESTING CO., Hoboken, New Jersey.

10. "LABOR AND MANAGEMENT BENEFIT BY INDUSTRIAL ENGINEERING PRINCIPLES" — 8-page illustrated folder outlining principles of industrial engineering as they apply to textiles.—AMERICAN ASSOCIATED CONSULTANTS, INC., New York, N. Y.

11. FLETCHER JUNIOR "SUPER-SELF-BALANCING" EXTRACTOR—Illustrated folder describing this new extractor with the highly efficient self-balancing arrangement which uses steel springs instead of rubber buffers.—FLETCHER WORKS, INC., Philadelphia, Pa.

PLANT AND PLANT MAINTENANCE . . .

102. "TANK TALK"—Sixteen page booklet of illustrations showing various types of elevated steel tanks constructed and erected by manufacturers as well as stand pipes, reservoirs, storage and high pressure vessels, cylinders, along with helpful technical data. Also a list of what a few of the cotton mills, etc., said.—R. D. COLE MANUFACTURING COMPANY, Newnan, Ga.

107. FINNELL SCRUBBERS — Illustrated leaflets describing and giving specifications for the new Finnell floor scrubbing machines.—FINNELL SYSTEM, INC., Elkhart, Ind.

108. RIHCO TYPE B HUMIDIFIER HEADS—Bulletin describes new atomizers with construction lessening air consumption. — ALDRICH MACHINE WORKS, Greenwood, S. C.

115. ATOMIZER HUMIDIFIERS—Recent issue of "Parks' Parables" on Turbomatic self-cleaning humidifiers, and automatic regulation. — PARKS-CRAMER CO., Fitchburg, Mass., and Charlotte, N. C.

129. BAHNSON CENTRIFUGAL HUMIDIFIER—Bulletin 327 describes this completely self-contained industrial humidifier which requires only water feed and drain and electrical connection to install.—THE BAHNSON COMPANY, Winston-Salem, N. C.

132. ROOF, WALL AND FLOOR INSULATION—Illustrated booklets on uses of PC Foamglas Insulation and describing its waterproof, fireproof and permanent insulating properties. — PITTSBURGH CORNING CORP., Pittsburgh 22, Pa.

135. SAFETY COLOR CODE—How six standard colors can be used to reduce hazards, cut down accidents.—E. I. DU PONT DE NEMOURS & CO., INC., Finishes Division, C44, Wilmington, Dela.

138. MAGNESIUM IN THE TEXTILE INDUSTRY—Illustrated booklet on properties of magnesium for spinning, twisting, winding, knitting machines, looms, beams, spools, bobbins.—ALUMINUM CO. OF AMERICA, Pittsburgh, Pa.

151. INDUSTRIAL BRUSHES—Illustrated Booklet of industrial brushes featuring textile usage on shears, printing machines—also flock, raising and cylinder brushes.—M. W. JENKINS' SONS, INC., Cedar Grove, N. J.

152. AIR CONDITIONING FOR THE TEXTILE INDUSTRY—40-page illustrated book covering air conditioning from humidity control to complete refrigerated conditioning with installations, charts, covering ABC's of cooling textile mills.—CARRIER CORP., Syracuse, N. Y.

155. GLASS BLOCKS—28-p. booklet with illustrations, engineering data, patterns PC glass blocks. —PITTSBURGH CORNING CORP., Pittsburgh 22, Pennsylvania.

159. BAHNSON HUMIDUCT SYSTEM — Bulletin 330 describes this unit system of air conditioning for humidifying, cooling, heating, ventilating, filtering, and dehumidifying in any desired combination. —THE BAHNSON CO., Winston-Salem, N. C.

160. INSTALLING MACHINERY WITHOUT LAG SCREWS OR BOLTS — Booklet describing use of UNISORB pads for anchoring all types of machinery. —THE FELTERS COMPANY, Boston, Mass.

162. MODERN METHODS OF TEXTILE FLOOR MAINTENANCE—Illustrated treatise on the history of floor cleaning in textile plants and a detailed description of new methods for reducing floor cleaning costs, as well as preserving textile mill floors.—G. H. TENNANT COMPANY, Minneapolis 11, Minn.

163. LAWLOR FLOOR MACHINES — Illustrated pamphlet containing specifications and describing All-Purpose Floor Machines.—THE SELIG COMPANY, Atlanta, Ga.

166. OAKITE PLANT MAINTENANCE DIGEST—A 16-page manual describing materials and methods for handling 54 recurring maintenance cleaning and related tasks in factories and mills.—OAKITE PRODUCTS, INC., New York 6, N. Y.

167. DU PONT COLOR CONDITIONING FOR INDUSTRY—Booklet, color used to reduce maintenance costs, increase production, curtail fatigue, improve employee morale. — E. I. DU PONT DE NEMOURS & CO. (Inc.), FINISHES DIVISION, Wilmington, Delaware.

170. WHY IT PAYS TO ANCHOR YOUR MACHINE WITH UNISORB—Illustrated booklet discussing control of vibration and noise and how UNISORB reduces maintenance costs.—THE FELTERS CO., Boston, Mass.

171. SULLIVAN T8-WG9—Illustrated bulletin describing the Sullivan line of heavy duty air compressors.—SULLIVAN DIVISION, JOY MFG. CO., Pittsburgh, Pa.

172. VENTILATING FANS—Bulletin 3339 gives facts on Buffalo Ventilating Fans. — BUFFALO FORGE CO., Buffalo, N. Y.

175. MOISTURE—Illustrated Folder, "The Yarn Conditioning System for the Textile Industry of Tomorrow."—KEARNY MFG. CO., INC., Kearny, N. J.

176. AUTOMATIC SELF-CLEANING ATOMIZER HUMIDIFIERS—Latest bulletin describing same.—AMERICAN MOISTENING CO., Providence, R. I.

177. DUCTLESS AIR CONDITIONING — Recent bulletin describing same.—AMERICAN MOISTENING COMPANY, Providence, R. I.

179. TOLEDO SCALES — A condensed catalogue which illustrates and describes all of the principal types of weight control equipment used in the textile industry. — TOLEDO SCALE COMPANY, Toledo, Ohio.

180. TANK MAINTENANCE — Illustrated folder describing R. E. McLean's methods of cleaning and painting water tanks and stand pipes. — R. E. McLEAN, Gastonia, N. C.

181. AIR FILTRATION AND DUST CONTROL—24 pages on atmospheric control, including engineering data.—AMERICAN AIR FILTER CO., INC., 275 Central Avenue, Louisville 8, Ky.

183. ELECTROMAGNETS — Folder No. 99 describes and illustrates fire prevention practices for opening and picking by use of high intensity electromagnets and magnetic pulleys.—DINGS MAGNETIC SEPARATOR CO., 569 E. Smith St., Milwaukee 7, Wis.

POWER TRANSMISSION, MOTORS, BELTING, LUBRICATION . . .

211. JOHNSON BRONZE CATALOGUE NO. 460—Shows over 850 sizes of cast bronze bushings. 350 sizes of UNIVERSAL Bronze Bars and over 250 Electric Motor Bearings. — JOHNSON BRONZE COMPANY, New Castle, Penna.

212. GATES TEXTILE ACCESSORIES — Showing the increased efficiency and economy to be secured through the use of Gates cone belts, evener belts, card bands and loom binder cushions.—THE GATES RUBBER COMPANY, Denver, Colo.

216. LEATHER BOOKLET NO. 202 — Attractive book illustrating and describing BONDARON Special Tanned Leather as used in various forms such as Check Straps, Solid Round Leather Belting, Flat Belting.—CHAS. BOND CO., Philadelphia, Pa.

218. BALL BEARINGS ON TEXTILE MACHINERY—Catalog 9 gives advantages of ball bearings, describes types, illustrates each type of textile machinery.—THE FAFNIR BEARING CO., New Britain, Connecticut.

230. ALLSPEED DRIVES — This 6-page folder covers features, advantages, available size of variable speed drives for the textile industry. Also listed are horsepower and torque data, and unit dimensions.—WORTHINGTON PUMP & MACHINERY CORPORATION, Harrison, N. J.

231. V-BELT ENGINEERING DATA BOOK—Over 50 pages of pertinent engineering information including data on selecting a V-belt drive design of special V-belt drives, numerous standard tables, charts and belt and sheaves list prices.—MANHATTAN RUBBER MANUFACTURING DIV. of Raybestos-Manhattan, Inc., Passaic, N. J.

235. JOHNSON LEDALOYL BEARING BRONZE—Illustrated booklet telling the complete story of Johnson Ledaloyl Bronze, the newest development in self-lubricated bronze for textile bearings and bushings.—JOHNSON BRONZE COMPANY, New Castle, Pennsylvania.

236. LEATHER BELTING CALCULATOR—Handy and attractive calculator for determining belt, speeds, horsepower per inch of belt widths, etc., will be sent free on request.—J. E. RHOADS & SONS, Philadelphia, Pa.

244. TEXACO SPINDURA OILS—Folder on lubrication for all types of spindles, based on actual tests.—TEXAS CO., New York City.

246. CUTTING OPERATING COSTS—Nationwide Illustrated Survey showing how American textile mills cut operating costs with Multiple V-Belt Drives.—GATES RUBBER CO., Denver, Colorado.

251. OILITE BEARINGS AND PARTS—Catalog B-44 describes and illustrates Oilite bearings and parts for all industries. — AMPLEX DIVISION, Chrysler Corporation, Detroit 31, Mich.

263. NEEDLE ROLLER BEARING—Catalog Engineering and Application Data Edition 32 contains full data on selection of proper Needle Roller Bearings and outlines uses of such in various commodities including textile uses, types, installations, lubrication, etc. — TORRINGTON COMPANY, Torrington, Conn.

264. NEW DEPARTURE SHOP MANUAL—Illustrated catalog showing ball bearing mounting and maintenance practice. Covers storage, cleaning, lubrication, types of bearings.—NEW DEPARTURE DIV., GENERAL MOTORS CORP., Bristol, Conn.

265. INTERCHANGEABLE BALL BEARING FOR REPLACEMENT—Charts showing numbers used by manufacturers to identify bearing characteristics, also information on specifications.—NEW DEPARTURE DIV., GENERAL MOTORS CORP., Bristol, Conn.

269. LUBRICATION AND MAINTENANCE OF BALL AND ROLLER BEARINGS—Illustrated bulletin describing efficiencies and economies of NON-FLUID OIL for all types ball and roller bearings.—NEW YORK AND NEW JERSEY LUBRICANT CO., New York, N. Y.

270. MANHATTAN FLEXLASTICS — Illustrated booklet describing how flexlastics are used in the Manhattan and Condor line of belting and mechanical rubber goods.—MANHATTAN RUBBER DIVISION, Passaic, N. J.

271. CARDING, SPINNING AND WEAVING LUBRICATION—Informative bulletin describing advantages of NON-FLUID OIL over ordinary lubricants for the lubrication of carding, spinning and weaving machinery.—NEW YORK AND NEW JERSEY LUBRICANT CO., New York, N. Y.

272. HOUGHTON LUBRICATION CHART — Attractive chart listing lubrication recommendations for all mill departments and various textile machines.—E. F. HOUGHTON AND CO., Philadelphia, Penna.

276. SPEED CONTROL—Bulletin 20B6051G describes Texrope variable speed drives. — ALLIS-CHALMERS MFG. CO., Milwaukee 2, Wis.

277. PRECISION COMPOUND AND CHAIN DRIVE—Folder explaining more profitable operation of roving frames.—PRECISION GEAR AND MACHINE CO., Charlotte, N. C.

278. ROLLER BEARINGS—New 35-page Hyatt handbook, "Guide Lines," is a guide to the proper application of cylindrical roller bearings in machinery and equipment of all types.—HYATT BEARINGS DIV., General Motors Corp., Harrison, N. J.

279. OILITE BULLETIN—Discussion of uses of oil-cushioned, self-lubricating bearings in product design and maintenance is contained in this illustrated bulletin. A wide range of machine parts is offered.—AMPLEX DIV., CHRYSLER CORP., Detroit 31, Mich.

280. BALL BEARING PILLOW BLOCKS AND FLANGE CARTRIDGES—Folder LAK contains informative text on ball bearing pillow blocks and flange cartridges incorporating the Fafnir Wide Inner Ring Bearings suitable for new as well as replacement applications in textile machinery.—THE FAFNIR BEARING CO., New Britain, Conn.

281. MULTI-V-DRIVES—16-page bulletin on Q-D (quick detachable) heavy sheaves. Descriptive information on design, application, stock sizes, and 75,000 V-Drive combinations available.—WORTHINGTON PUMP AND MACHINERY CORPORATION, Harrison, N. J.

INSTRUMENTS, STEAM SPECIALTIES . . .

301. JOHNSON ROTARY PRESSURE JOINTS—Bulletin describing the rotary pressure joint which requires no packing, no lubrication and no adjustment, giving installation and maintenance instruction, types, sizes, dimensions and prices. — THE JOHNSON CORP., Three Rivers, Mich.

307. THERMOMETER AND PRESSURE GAUGES—Catalog 6705-R and 6706 give data on both circular and rectangular case pressure type thermometers for indicating, recording and controlling processing operations in textile industry.—BROWN INSTRUMENT COMPANY, Philadelphia, Pennsylvania.

311. PIPING POINTERS—Industrial maintenance book covering installation and handling of piping, valves, fittings. Well illustrated, practical tips. — CRANE CO., Chicago, Ill.

314. MOISTURE CONTENT CONTROL — Bulletin F-1705-1 giving details of features and benefits of moisture equipment control for slashers and textile applications. — BARBER-COLMAN CO., Rockford, Ill.

315. CONTROL INSTRUMENTS FOR TEXTILE PROCESSES—32-page illustrated booklet describing controls for such processes as slashing, dyeing, bleaching, kier boiling, drying, air-conditioning, etc. —BROWN INSTRUMENT CO., Philadelphia, Penna.

316. HYDRAULIC POWER UNITS—Literature describing hydraulic unit, motor, pump, reservoir, valving a small compact unit for operating of hydraulic calenders, presses, hydraulic controls, etc.—B. F. PERKINS & SON, INC., Holyoke, Mass.

317. POWELL VALVES FOR CORROSION RESISTANCE—20-page booklet which briefly describes and illustrates the very complete line of Powell valves available in a large variety of metals and alloys to handle all corrosive fluids—to help solve flow control problems where corrosion may be encountered.—THE WILLIAM POWELL CO., Cincinnati 22, Ohio.

320. **OAKITE POWER PLANT DIGEST**—A 20-page manual describing materials and methods for handling 71 cleaning, degreasing, descaling, derusting, paintstripping and related operations encountered in power plants.—OAKITE PRODUCTS, INC., New York 6, N. Y.

321. **RED-RAY BURNERS**—Bulletin describing use of Red-Ray Burners in preheating and partial drying to increase capacity of frame.—RED-RAY MFG. CO., New York, N. Y.

322. **DIAMOND SWING JOINTS**—4-page illustrated folder describing the Diamond line of ball, swing and revolving joints for use on any system handling air, gas, steam, oil, or any fluid where reflexible connection is needed.—DIAMOND METAL PRODUCTS CO., St. Louis, Mo.

323. **TENTER FRAME DRYER**—Illustrated folder describing the features and operating principle of newly designed, high speed tenter frame dryer.—NATIONAL DRYING MACHINERY COMPANY, Philadelphia 33, Pa.

CARDING, SPINNING, WINDING, ETC. . . .

401. **LUMMUS DUSTLESS, STEEL, BLENDING FEEDERS**—Bulletin describing automatically closing, positively locking door on feeders to prevent overloading, choking.—ALDRICH MACHINE WORKS, Greenwood, S. C.

402. **AUTOMATIC CLEANING AND OVERHEAD HANDLING FOR TEXTILE MILLS**—24-page bulletin describing the American Monorail Automatic Cleaner for preventing accumulation of lint on spinning, twisting, winding and warping machines. Also for cleaning monitors and card room ceilings.—THE AMERICAN MONORAIL CO., Cleveland, Ohio.

407. **CARD GRINDER INFORMATION**—Folder on care of card grinders, part replacements, etc.—B. S. ROY & SON CO., Worcester, Mass., and Greenville, South Carolina.

409. **ROTO CONER**—Bulletin describing Universal rotary traverse winder, known as the Roto Coner, producing open wound cones for knitting and warping; parallel tubes for package dyeing, twisting, and sale yarn.—UNIVERSAL WINDING CO., Providence, Rhode Island.

413. **SONOCO PRODUCTS**—A 60 page illustrated booklet giving description, specifications and charts of the many Sonoco products, including bobbins, cones, tubes, cork cots, roving cans, spools, rolls, etc.—SONOCO PRODUCTS CO., Hartsville, S. C.

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432. **PRECISION TEXTILE WINDING**—Bulletin on Kidde Tension and Density Control for winding rubber cores.—WALTER KIDDE & CO., INC., Belleville, N. J.

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434. **WINDING MACHINES—WORK LOAD CALCULATIONS**—Reprints of series on winder operations from labor standpoint.—UNIVERSAL WINDING CO., Providence, R. I.

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WEAVING, SLASHING . . .

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510. **THE ROMANCE OF PRAIRIE GOLD**—Attractive illustrated book which tells the story of corn and the uses of corn products in industry.—CORN PRODUCTS SALES CO., New York, N. Y.

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513. **SEYCO PENETRANTS FOR YARN CONDITIONING**—Folder describing the scientifically formulated Seyco sizing.—SEYDEL-WOOLLEY & CO., Atlanta, Ga.

514. **SLASHER HOODS**—Pamphlet describing drip-proof slasher hoods for cotton or rayon slasners. Roof or sidewall exhaust.—WOLVERINE EQUIPMENT CO., Cambridge 42, Mass.

515. **TEXTILE COUNTERS**—Catalog No. 50 illustrating and describing complete line of Producto-meter Loom Pick Counters; Hank Counters; Yardage, Electric and Predetermined Counters; Tachometers, etc.—DURANT MANUFACTURING CO., Milwaukee 1, Wisconsin.

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517. **LOADING SYSTEM**—Bulletin 417, on pneumatic loading system for Saco-Lowell slasher size box squeeze rolls, contains installation photo, features, specifications, and prices.—THE FOXBORO COMPANY, Foxboro, Mass.

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DYEING, FINISHING, CLOTH ROOM . . .

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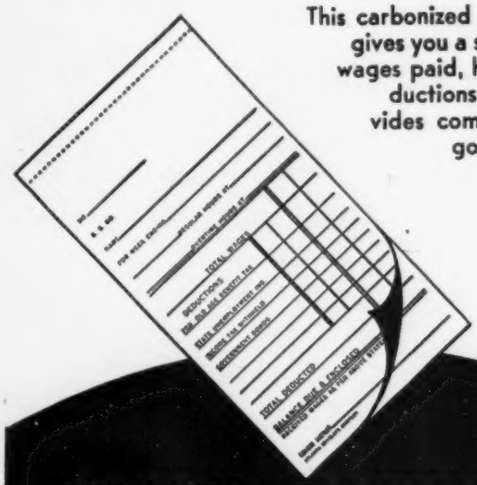


This carbonized payroll envelope gives you a signed receipt for wages paid, hours worked, deductions, etc. It also provides complete record for government payroll reports.

Take no chance—take a receipt!

Write Today for Samples.

ATLANTA ENVELOPE CO.

BOX 1267 • ATLANTA (1) GEORGIA

Knitting and Warp Yarns

4's to 30's

AVONDALE MILLS

SYLACAUGA, ALABAMA

SALES REPRESENTATIVES

COMER-AVONDALE MILLS, INC.

Boston — Chattanooga — Chicago — Charlotte
New York — Philadelphia — Reading

Industrial Engineers

SPECIALIZING IN TEXTILES FOR OVER ONE-THIRD OF A CENTURY

PAY ROLL CONTROLS WORK LOAD STUDIES
COST SYSTEMS SPECIAL REPORTS

COST REDUCTION SURVEYS

RALPH E. LOPER CO.

GREENVILLE, S. C. FALL RIVER, MASS.

TEXTILE LEATHERS *bearing the name*

ORIGINAL AND GENUINE

Bondaron

REG. U. S. PAT. OFF.

"The Leather with the Hair On."

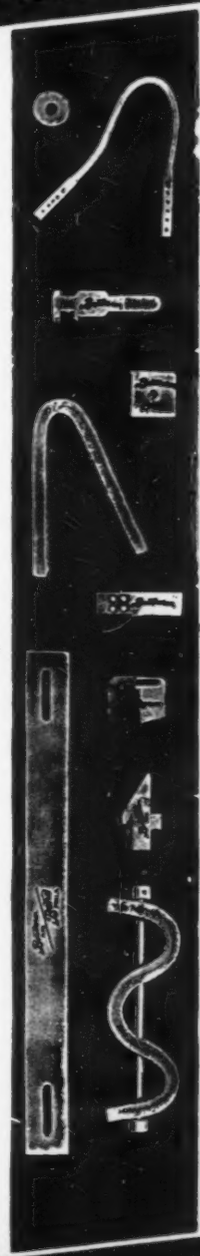
LAST 2 to 5 times LONGER

—Proving the

ECONOMY OF QUALITY!

ORIGINAL AND GENUINE *"The Leather with the Hair on"* Bondaron REG. U. S. PAT. OFF.

TEXTILE LEATHERS



cost slightly more than ordinary leathers—BUT they

SAVE MONEY

BECAUSE—

1. They last many times longer.
2. They cause fewer holdups in production.
3. They produce fewer "seconds" in materials.

RESULT:

GREATER NET PROFITS

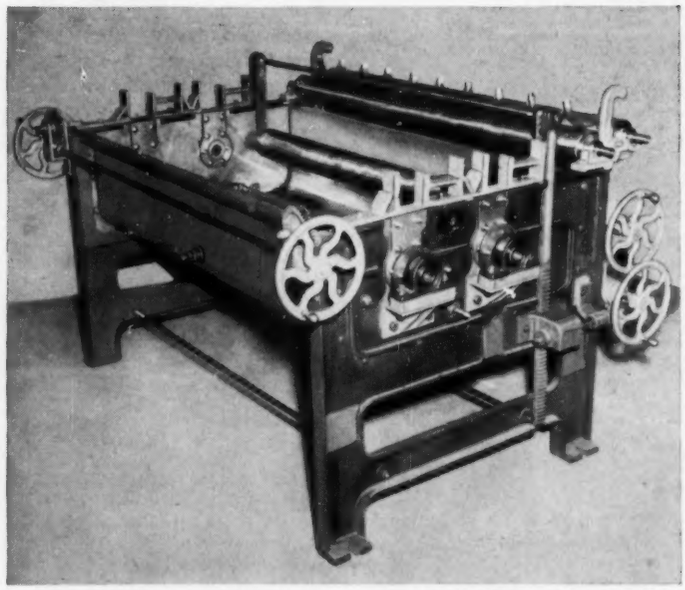
CHARLES Bond COMPANY

617-623 Arch St., Philadelphia, Pa.

Manufacturers of Textile Leathers for Nearly Half a Century

Another Example of

SIMS CRAFTSMANSHIP

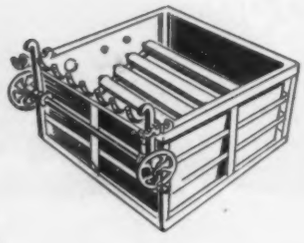


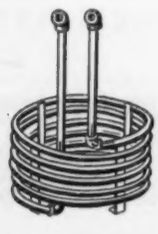
Stainless Steel Vat, Coils and Rollers and Thread Guide for Size Boxes

Eliminate expensive shut-downs for repairs by modernizing your size boxes with this non-corrosive, maintenance-free material. Fabrication of both commonplace and complicated shapes and sizes cost no more than many others when SIMS' 20 years of "know-how" are applied, and both quality and workmanship are guaranteed. Whether your needs are for new equipment or repair of existing ones, let us help you *from the start.*

FABRICATORS **Sims METAL WORKS** SINCE 1928

WEST POINT GEORGIA





U. S. RING TRAVELERS

Long-Life Bronze for Wet Twisting

U. S. bronze travelers give longer life today than ever before because we've tried out many special alloys and arrived at an exceptionally good one. It's safe to say the resistance to wear and general service life is 20 to 35% greater than just a few years ago. The combination of better bronze and our distinctive Bevel Edge on wet twisting really makes a difference. Swing to U. S. — a swing in the right direction.

On-the-spot Service — Prompt Delivery

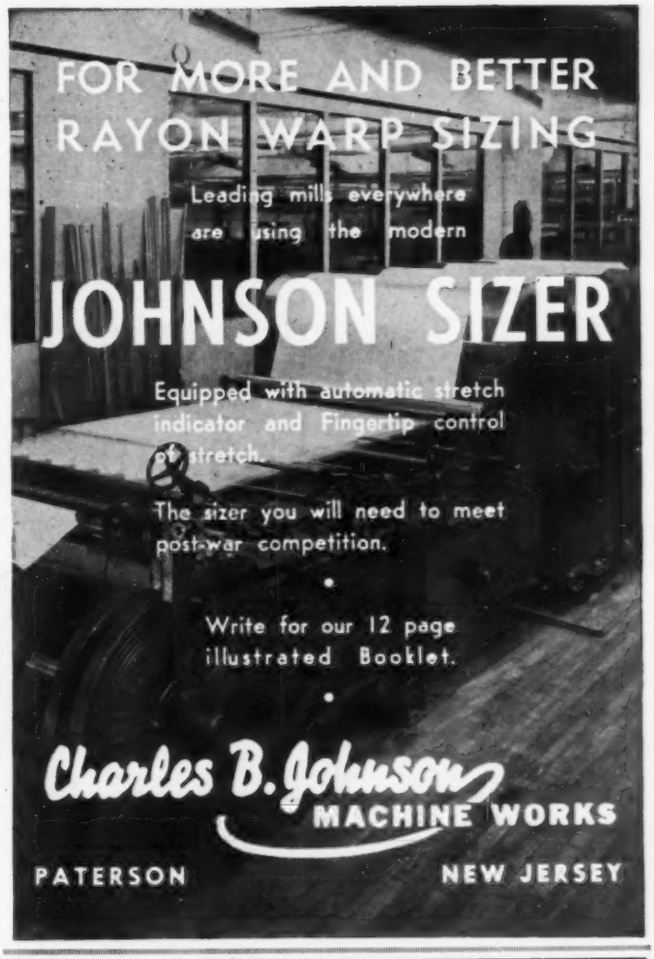
U. S. RING TRAVELER CO.

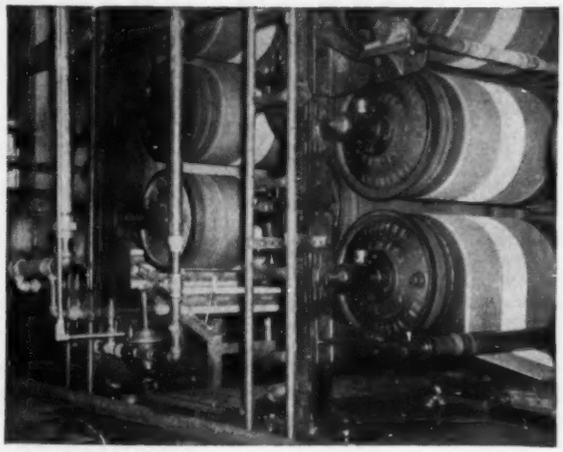
AMOS M. BOWEN, President & Treasurer

HOME OFFICE & FACTORY: PROVIDENCE, R. I.
SOUTHERN OFFICE & WAREHOUSE: GREENVILLE, S. C.

Write, wire or phone nearest office.

W. P. VAUGHAN, W. H. ROSE—Greenville, S. C.—Box 1048—Phone 3031
O. S. LAND—Athens, Ga.—Box 1187—Phone 478
L. H. MELLOR, JR.—Mid-Atlantic States—123 Treaty Rd.—Drexel Hill, Pa.—Phone Hilltop 2946
H. R. FISHER—Concord, N. C.—Box 83—Phone 8356
C. W. SMITH, H. J. SMITH—Providence—Box 1187—Gaspee 0100


FOR MORE AND BETTER
RAYON WARP SIZING
Leading mills everywhere are using the modern
JOHNSON SIZER
Equipped with automatic stretch indicator and Fingertip control of stretch.
The sizer you will need to meet post-war competition.
Write for our 12 page illustrated Booklet.
Charles B. Johnson
MACHINE WORKS
PATERSON
NEW JERSEY



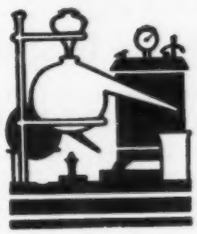
RED-RAY BURNERS

Red-Ray Radiant Gas Burners installed under steam drying cans. Better and faster production. No additional space required.

WRITE FOR BULLETINS

RED-RAY MANUFACTURING CO., INC
455 West 45th Street — New York 19, N. Y.

AQUAKAL #77



A SYNTHETIC AMINE DETERGENT

REPLACES soap or portions of your Soap—for SCOURING piece goods, Cotton, Wool, Rayon, Acetate or Nylon.

Brighter colors due to the

PENETRATING and LEVELING qualities.

Excellent for Soaping Vats — not affected by hard water.

HYDROXY HAND CREAM — for the operators handling nylon to keep their hands smooth.

Kali MANUFACTURING COMPANY

Manufacturing Chemists
427 MOYER ST. — PHILADELPHIA 25, PA.

BROWN MFG. CO.

CONCORD, N. C.

☆

Manufacturers of

COTTON FLANNELS

★

Fletcher

TEXTILE EXTRACTORS
NARROW FABRIC LOOMS
THROWING MACHINERY

Est. 1850
FLETCHER WORKS
PHILADELPHIA 40, PENNA.

CHEMICALS FOR

SIZING • REDUCING
DESIZING • WETTING
STRIPPING • FINISHING

ROHM & HAAS COMPANY
WASHINGTON SQUARE, PHILADELPHIA 5, PA.
Manufacturers of chemicals for the Textile, Leather and other Industries . . .
Plastics . . . Synthetic Insecticides . . . Fungicides . . . Enzymes

Use ATCO Products

Not Always How Old ...*Always* How Good!

A REPUTATION

is made up of a lot of ingredients . . . experience, integrity, quality merchandise, etc. These factors are present in many firms with long histories, and also in firms with many less birthdays.

Our reputation is just ten years old, but the important point is it has *always* been good!

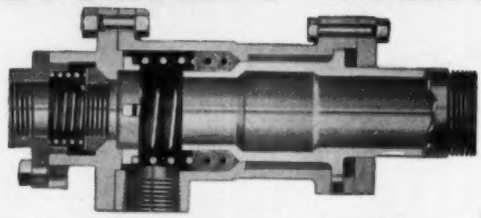
We invite you to prove this for yourself.

Use ATCO Products

Atlantic Chemical Co., Inc.
MAIN PLANT: CENTREDALE, RHODE ISLAND
BRANCH OFFICE: PATERSON, NEW JERSEY

GUARANTEED LEAK-PROOF "DIAMOND"

REVOLVING JOINTS



Permanently end leaking and stuffing box trouble on all kinds of Steam-Heated and Water-Cooled Rolls. No tight packing to act as brake on roll. Patented construction. Specially compounded molded gasket lasts up to 15 months in severest service—easy, quick and inexpensive to replace.

Write for Bulletin and Price List

DIAMOND METAL PRODUCTS CO., 406 Market Street, St. Louis 2, Mo.

SPECIALISTS
in Tank Maintenance

. . . NO-OX-ID Coating . . . the rust preventive that lasts indefinitely.

Highly Trained Men

We Buy, Sell, Move and Recondition Tanks

R·E·McLEAN
SINCE 1920
POST OFFICE BOX 1062
GASTONIA, N. C.

One of a series *of messages to help you increase your understanding of business paper advertising, and its effect on your business.*

How much longer can your company afford to "refuse business tactfully"?

LET'S FACE IT — the honeymoon is about over. It was fun while it lasted, but it won't pay the rent. Not now.

After an absence of seven years, the spectre of a buyers' market is once more rearing its head, and its expression plainly reads—"I'm going to be hard to get."

This doesn't scare anybody who hasn't forgotten *how to sell.* But there are quite a few of us in American business who could use a quick refresher course. (We've had a long "vacation.")

When it comes to production, our output is up almost 100 per cent. We've acquired a lot of new techniques on the assembly line, because it was obvious that if there were to be any profits left—after increased labor costs, high-priced materials, and taxes—we'd have to trim every last ounce of fat off the manufacturing cost per unit.

But now the time has come when we must apply the same philosophy to the *manufacture of a sale.* That means—*more mechanization!*

Confronted with a buyers' market, how much will it cost *your* company to produce one unit of sale? A prohibitive sum, if you're going to depend entirely on personal contact. You'd have to hire a tremendous force of salesmen to cover the field. Even then, much of their valuable time would be spent on "missionary work"—which is really a job for *mechanized selling.*

Mechanized selling is simply another name for consistent and aggressive advertising. Like the machine on the production line, it is a multiplier of men's efforts, for it enables them to produce (*and earn*) far more than they could alone.

And when it goes to work in the business press, it becomes the most efficient machine at your disposal for *manufacturing sales at a profit!*

Just how efficiently does business paper advertising work? If you'd like to see some examples, we'll be glad to send you a recent ABP folder on actual results. Also, if you'd like reprints of this advertisement (or the entire series) to show to others in your organization, you may have them for the asking.

TEXTILE INDUSTRIES

is one of the 129 members of The Associated Business Papers, whose chief purpose is to maintain the highest standards of editorial helpfulness—for the benefit of reader and advertiser alike.

Grantville Mills

GRANTVILLE, GEORGIA

Work Socks, Colored Hosiery Yarns

and Bleached Yarns

BARNES SERVICE *Consulting Engineers*

TO THE TEXTILE INDUSTRY FOR OVER ½ CENTURY

Surveys—Reorganizations—New Plant Developments for Cotton, Wool, and Synthetic Yarn and Cloth Processing, Bleaching, Dyeing, Printing and Finishing.

★ Plant Appraisals ★ Mechanical and Operating Surveys—New Methods ★ Scheduling and Planning ★ Work Load Studies, Job Anglysis and Evaluation, with Incentive Plans ★ Standard Cost Installations ★ Cost Control Methods

Labormeter Burden-meter Waste-meter

BARNES TEXTILE ASSOCIATES, Inc.

10 HIGH STREET, BOSTON 10, MASS.

318 MONTGOMERY BLDG., SPARTANBURG, S. C.

The following is a typical letter written by a client, indicating the range and quality of service rendered by the Barnes engineers:

"We have employed Barnes Textile Associates, Inc., regularly since 1928. During this period we have consulted them on an infinite variety of problems having to do with the efficient operation of a textile plant.

"They have installed our cost systems, labormeters, carried out time and operating studies, worked with us in labor conferences, installed quality controls, advised us with regard to merchandising, assisted us in the purchase of machinery, laid out one completely modern plant which is in operation today, employing 2,300 employees, and have submitted plans for an additional plant and modern dye house.

"We consider them the outstanding textile engineers in the country today, both with regard to ability and integrity, and, during our nineteen years of close contact with this firm, their services have been invaluable."

An Up-to-Date

PRINTING PLANT

- Equipped with modern machinery and a staff of competent workmen, solicits thru this publication, a trial order on your printing needs.
- We have built a reputation that is known over the entire South by our special attention to the minutest detail.
- We are more than ready to answer any question that relates to your printing problems.

Write us and let us quote you on anything from a postal card to a fully bound book

L. A. Lee Company, Inc.

DALTON, GEORGIA

Printers and Publishers

WHITTIER & DUPILLE

INDUSTRIAL ENGINEERS

WAGE AND JOB EVALUATIONS — APPLICATION OF IMPROVED METHODS — DEVELOPMENT OF TRAINING PROGRAMS — INSTALLATION AND MODERNIZATION OF WAGE INCENTIVES — PRODUCTION COST CONTROLS — TECHNICAL ADVICE IN LABOR RELATIONS.

CANDLER BUILDING ATLANTA, GEORGIA

PICKENS MILL

PICKENS, S. C.

☆

Narrow Sheetings

ALL STEEL
ECONOMY BALING PRESSES
ALL SIZES FOR ALL PURPOSES
LARGEST LINE BUILT IN U.S.A.

ECONOMY BALER CO., DEPT. C. ANN ARBOR, MICH., U.S.A.

REPRESENTATIVES:

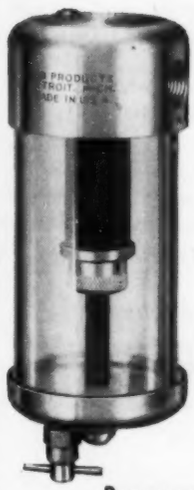
43 Water St., New York 4, N. Y.

Drexel Bldg., Philadelphia, Pa.

Terrell Machine Co., 1200 No. Church St., Charlotte, N. C.

170 Summer St., Boston 10, Mass.

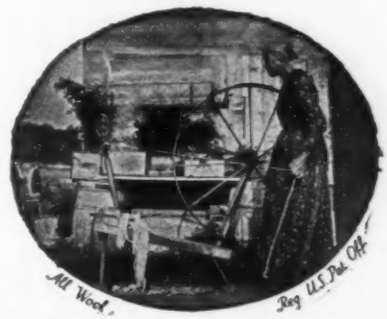
NEW M-B
Automatic
AIR LINE FILTER



RIBBON TYPE FILTERING ELEMENT removes solids 10 microns (.00039") and larger. It is a radical departure from general practice, bowl being a transparent plastic. Consequently all foreign matter filtered from the air line is clearly visible, eliminating guess work as to when filtering element should be cleaned or bowl drained. There is NO WATER, DIRT OR OIL in compressed air that has passed through this filter. . . . It gives our "Amoskeag" Pneumatic ROLL PICKER, Model A.V.T., or similarly air-operated equipment, maximum protection.

Representatives in Principal Cities

M-B PRODUCTS
130-134 E. Larned St.
DETROIT 26, MICHIGAN



KNOXALL

ROLLER, SLASHER AND CLEARER CLOTH
ENDLESS BLANKETS RAYON SLASHER JACKETS
ENDLESS REVOLVING CLEARERS

EDWARD H. BEST & CO.

Est. 1888 BOSTON, MASS. Inc. 1901

ATLANTA, GA.
W. C. HAMES
185 Pinecrest Ave., Decatur, Ga.
Dearborn 5974

NEW YORK
H. W. CURTIS
738 W. Crescent Ave., Allendale, N. J.
Allendale 1-3821

GREENVILLE, S. C.
WILLIAM J. MOORE
1 Pendleton Street
7646

Quality Shuttles

Watson-Williams shuttles have been the Textile Industry's choice since 1830.

Southern Representatives: WATSON and DESMOND, Clifton E. Watson and S. P. V. Desmond, 118½ West Fourth St., Charlotte, N. C.; John W. LITTLEFIELD, 810 Woodside Bldg., Greenville, S. C.; Walter F. DABOLL, Jefferson Bldg., Greensboro, N. C.
Western Representative: Arthur J. BAHAN, P. O. Box 245, La Porte, Indiana.
Northern Representative: Guy C. BURBANK, 32 Beaconsfield Rd., Worcester 2, Mass.

WATSON-WILLIAMS MFG. CO. Millbury, Mass.

J. E. SIRRINE CO.
GREENVILLE • SOUTH CAROLINA

Engineers
ESTABLISHED 1902

TEXTILE MILLS • RAYON PLANTS • KNITTING MILLS • DYE HOUSES
BLEACHERIES • STEAM UTILIZATION • STEAM POWER PLANTS
WATER • WASTE DISPOSAL • APPRAISALS • PLANS • REPORTS

This is the Age of SPEEDS and LONG DRAFT SPINNING

Ring Travelers of greater stability are necessary. Wentworth Double Duty, Wentworth Gravity and Gravity Express meet these requirements.

Duplex Twister Travelers—Berylian Finish. Special Travelers for Silk and Rayon—National-Etartnep Finish—a new chemical treatment.

NATIONAL RING TRAVELER CO.

PAWTUCKET, R. I. **CHARLOTTE, N. C.**

SOUTHERN OFFICE—131 West First St., Charlotte, N. C.

L. Everett Taylor, General Manager, Charlotte, N. C.
H. B. Askew, Southern Agent, P. O. Box 221, Griffin, Ga.
James B. Poteet, P. O. Box 221, Griffin, Ga.
Mr. W. Harry King, P. O. Box 272, Atlanta, Ga.
Mr. J. K. Sumner, Charlotte, N. C.
Mr. Frank S. Beacham, Charlotte, N. C.
Mr. Donald C. Creech, Charlotte, N. C.

- PROCESSING METHODS
- PLANT LAYOUTS
- MATERIALS HANDLING
- MANUFACTURING CONDITIONS
- CONTROLS FOR MACHINES SUPPLIES WASTE QUALITY MAINTENANCE
- ADMINISTRATIVE ROUTINES

WERNERTEX P. O. M. CO.

60 E. 42nd ST., NEW YORK, N. Y.

Consultants to the Textile Industry

LAZENBY

DH-400 SPOOLER

Designed for the winding of 4" Wilton Spools from Skein or Twister Spools, including Bit-Winding.

Special features include automatic part-spool winding and automatic stop motions at high speed operation.

Send us a small supply of your yarn and we will wind and return with Test-Wind Report and Catalog.

F. A. LAZENBY & CO.

3106 ELM AVENUE **BALTIMORE 11, MD.**

NEWNAN COTTON MILLS

NEWNAN, GEORGIA ESTABLISHED 1888

★

Natural and Colored Novelty, Cotton, Rayon, Mixed Fibre and Worsted Knitting and Weaving Yarns and Fabrics.

NEW YORK OFFICE, 2 Park Ave.

TURNER HALSEY CO.
40 Worth St., New York

CARL L. MILLER & SONS
Reading & Philadelphia

COSBY & THOMAS, Charlotte

C. M. PATTERSON, Chicago

J. P. RICKMAN, Chattanooga

DENCO

Finest machine tools for shops, mills and manufacturing plants. General machine tools. Special tools for the manufacturer.

Quick service resharpening your tools.

Straight fluted high speed production reamer with Morse taper shank.

Dennison

Write for catalog and price list.

DENNISON MACHINE TOOL CO.

1300 North 22nd St. — Box 2251 — Phone 1376L — Hickory, N. C.

CAROLINA *Mills, Inc.*

MAIDEN, NORTH CAROLINA

☆

PLIED CARDED YARNS — CANTON FLANNELS

☆

Commission Bleaching of Knit Goods

CAROLINA MAIDEN — QUALITY TEXTILES

CLASSIFIED ADS

BUSINESS—EMPLOYMENT—EQUIPMENT—PROFESSIONAL CARDS—OPPORTUNITIES

DISPLAY RATES

Rates are net, payable in advance each month. Page is 3 columns, 10 inches deep—30 inches to page. Space measured by even inch vertically by 1, 2 or 3 columns in width. Column width 2¼ inches. Rates based on the total space used in one year.

	Per Inch		Per Inch
1 inch	$7.00	30 inches	$6.00
10 inches	6.50	100 inches	5.00

UNDISPLAYED

Positions wanted .05 word per insertion. Minimum charge 1.00 per insertion. Cash with order. Box number address care of TEXTILE INDUSTRIES, Grant Bldg., Atlanta, Ga., count as eight words. Advertisements for help wanted, equipment for sale, for rent or wanted, and professional cards are accepted at display rates only.

MEN WANTED—POSITIONS OPEN: Plant superintendent experienced in preparatory operations and C & K looms; general manager hosiery mill; thread yarn manufacturer for assistant superintendent; chemist to head up research department; dyer and bleacher, cotton yarns; dyer, jigs and pads, South America; loom fixers, foreign; manager dyeing, bleaching, printing (foreign); young textile school graduate for assistant superintendent; weave room overseer familiar with slashing; sewing and hosiery machine fixers; tricot finisher; dyer and chemist, synthetic fibres.

We invite correspondence (confidential) with mill men seeking new positions and employers seeking new personnel.

CHARLES P. RAYMOND SERVICE, INC.

294 WASHINGTON STREET Phone: Liberty 2-6547—2-6548 BOSTON 8, MASS.

Over 50 years of confidential employment service for men seeking positions and employers seeking men.

FOR SALE

WORSTED UNITS—BRADFORD SYSTEM

1—50,000 Spindle Unit	1—5,000 Spindle Unit
1—20,000 Spindle Unit	1—3,000 Spindle Unit
1—10,000 Spindle Unit Complete with Combing	1—1,200 Spindle Unit
	1— 600 Spindle Unit

Odd Machines for Combing, Drawing, Spinning, Twisting

BOBBINS, CANS, TRUCKS, PARTS, ETC.

We Offer a Complete Service for the Erection of Worsted Machinery. Crating for Export a Specialty.

PHONE! • WIRE! • WRITE!

APPRAISALS LIQUIDATIONS

WARREN J. TALBOT INC.

30th & Reed Sts. Fulton 9-0200 Phila. 46, Pa.

TEXTILE MILL IN INDIA SEEKS SUPERINTENDENT

WANTED a Spinning and a Weaving Master for a large modern textile mill in United Provinces (India) consisting of about 125,000 spindles and 2,000 looms. Salary no consideration. Only first grade experienced technicians need apply with their references and technical qualifications to Box 4, Doremus & Company, Advertising, 120 Broadway, New York 5, N. Y.

POSITION WANTED

Competent Industrial Engineer supervising all Standards Work in large Carolina Weaving Mill is desirous of change and wants to become permanently associated with reliable Mill or Mills as Manager of Standards. Experience "on the Firing Line" in all phases of time study, job load appraisals and evaluation, Union Contract Negotiations, Piece Work and incentive programs and their application, effective forms of labor cost controls, supplemented very advantageously by actual experience in Manufacturing, Processing and Mill Management. A man with such versatile experience in both fields of the Industry could keep your standards work well organized. References from some of the top men in Industry. Box 210, TEXTILE INDUSTRIES, Grant Bldg., Atlanta, Ga.

FOR SALE

Two slubbers 11" x 5½", 60 spindles each. Running now, can be seen on mill floor. A-1 condition. One Woonsocket chain drive and one Whitin self balance rail, chain drive.

FRIEDA MFG. CO.

Kings Mountain, N. C.

Att: G. R. Hooper, Mgr.

WANTED

Job as night superintendent or overseer carding, spinning and twisting. Experience on white and colored warp. Fine and numbers. Employed as night overseer but would like to change. Married, age 44, sober. Good manager of help. Address "Night Overseer," TEXTILE INDUSTRIES, Grant Bldg., Atlanta, Ga.

POSITION WANTED

Experienced Weave Room Overseer available. Now employed but desires to make change for good reasons. Have 20 years experience in weaving, 12 years as second hand and overseer on all types of Draper work. Am 40 years old; married; sober, and perfectly reliable. No bad habits. Go anywhere. Box 207, TEXTILE INDUSTRIES, Grant Bldg., Atlanta 3, Ga.

LIQUIDATION

AMTEX SPINNING COMPANY — PAWTUCKET, R. I.

Worsted on the American System

2—Prince Smith Gill Boxes, single can
4—H & B Drawing Frames, 10" Coilers
1—Saco-Lowell 12 x 6 Slubbers, 72 spd.m.d.
1—Saco-Lowell 10 x 5 Slubber, 48 spd. Super draft, motor driven
2—Saco-Pettee 10 x 5 Intermediates, 96 spd., Conv. Draft, motor driven
2—Saco-Lowell 7 x 3½ Fine Speeders, 144 spindles each, motor driven
1—Cot Buffing Machine
1—Roll Covering Machine
1—Hank Roving Sizing Machine
1—Twist Tester
6—H & B Spinning frames, 224 spindles ea., 3" gauge, 2" rings, motor driven
3—Saco-Pettee Spinning frames, 224 spd. ea., 3" gauge, 2" rings, motor driven
Above equipped with CasaBlanca Long Draft or Whitin worsted conversion
1—Foster No. 101 Cone Winder, 100 spindles, motor driven
4—Whitin Twisters, 112 spindles each, 4½" gauge, 3½" ring, motor driven
12—"Standard" Humidifiers
1—Brown & Sharpe Grain Scale
1—Yarn Tester (Break strength)

All equipment, parts, trucks and supplies

Sole Liquidating Agents

BAY STATE TEXTILE COMPANY

Liquidations — MACHINERY — BOBBINS — SUPPLIES — Appraisals

220 Hartwell Street
FALL RIVER, MASS

Triangle offers good used Narrow Fabric Machinery — Looms — Warpers — Winders — Creels — Battens — and Supplies.

TRIANGLE PROCESSING MACHINERY CO., INC.
313 Straight Street — Paterson 3, N. J.

FAIRBANKS-MORSE DIESEL ENGINE

Model 37F-14, 5 cylinder 14" x 17", 575 horsepower at 300 R.P.M. Air starting, direct reversible. This engine almost new condition, offered for approximately 25% of new price. Will make a fine power unit for small factory, mill or large pumping plant. Contact us for detailed information and inspection. We also have several tug boats and deck barges for sale. Charles C. Smith Corporation, 905 M & M Building, Houston, Texas.

WRAPPING MACHINES

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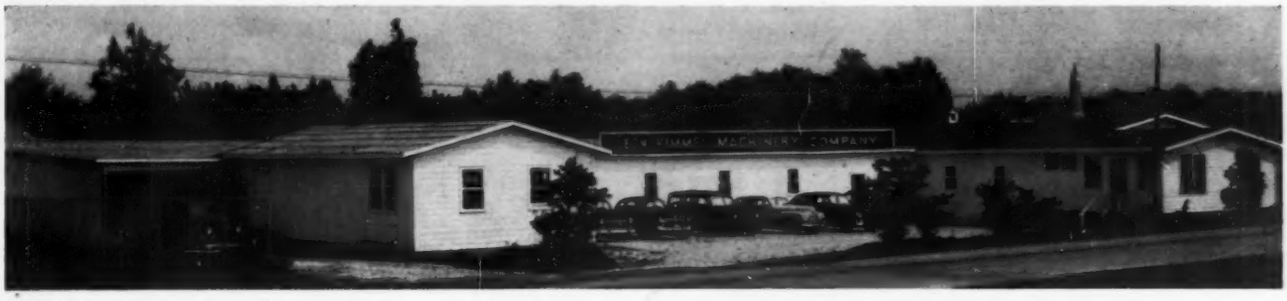

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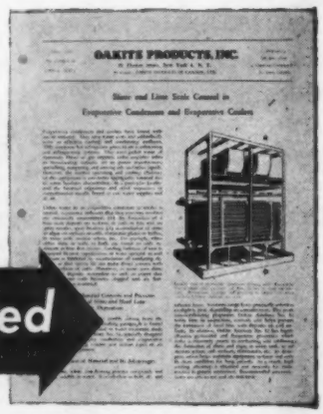

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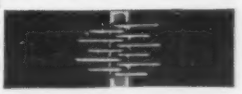

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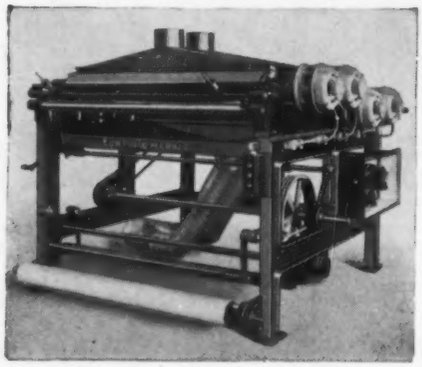

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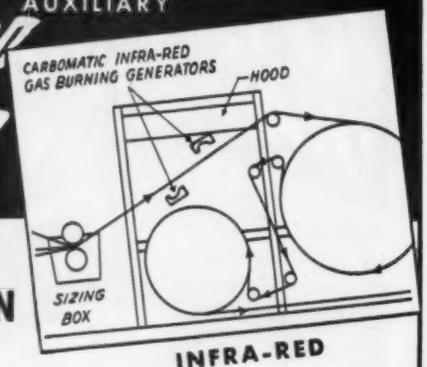

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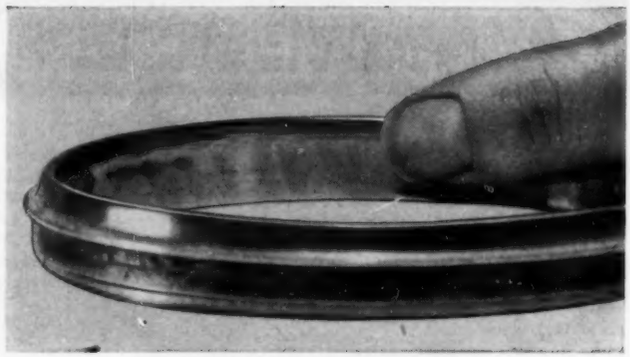

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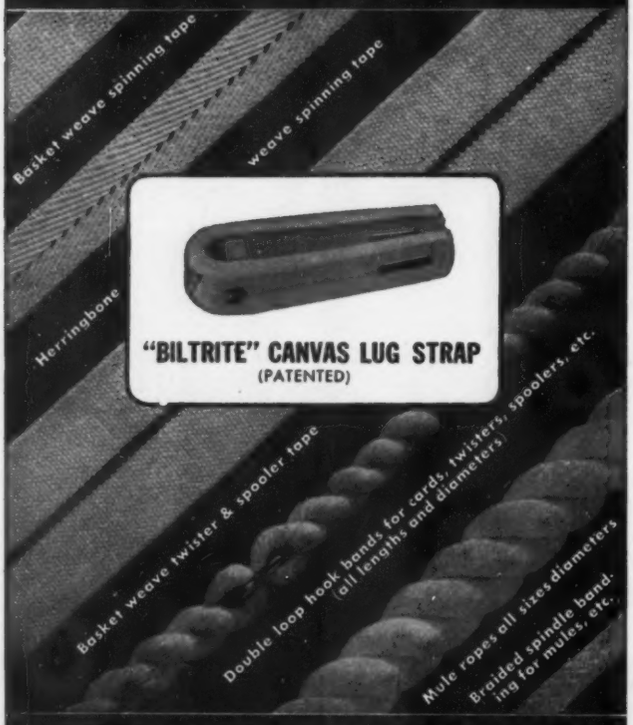
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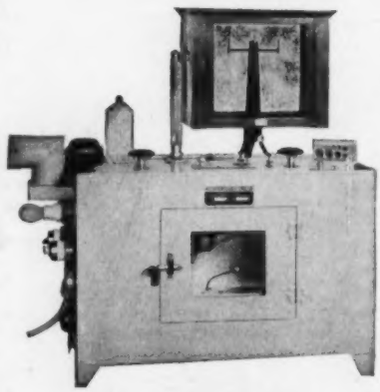

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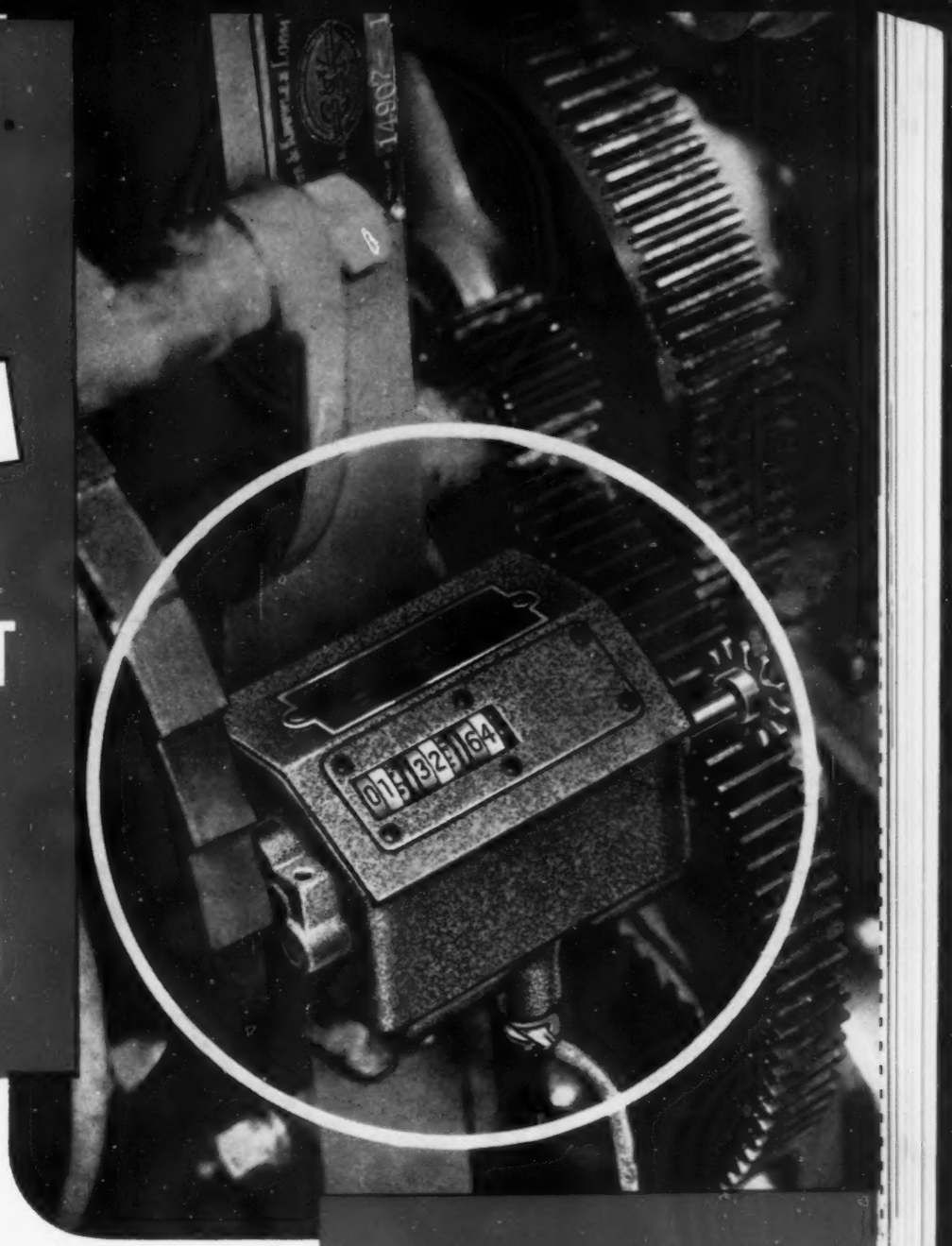

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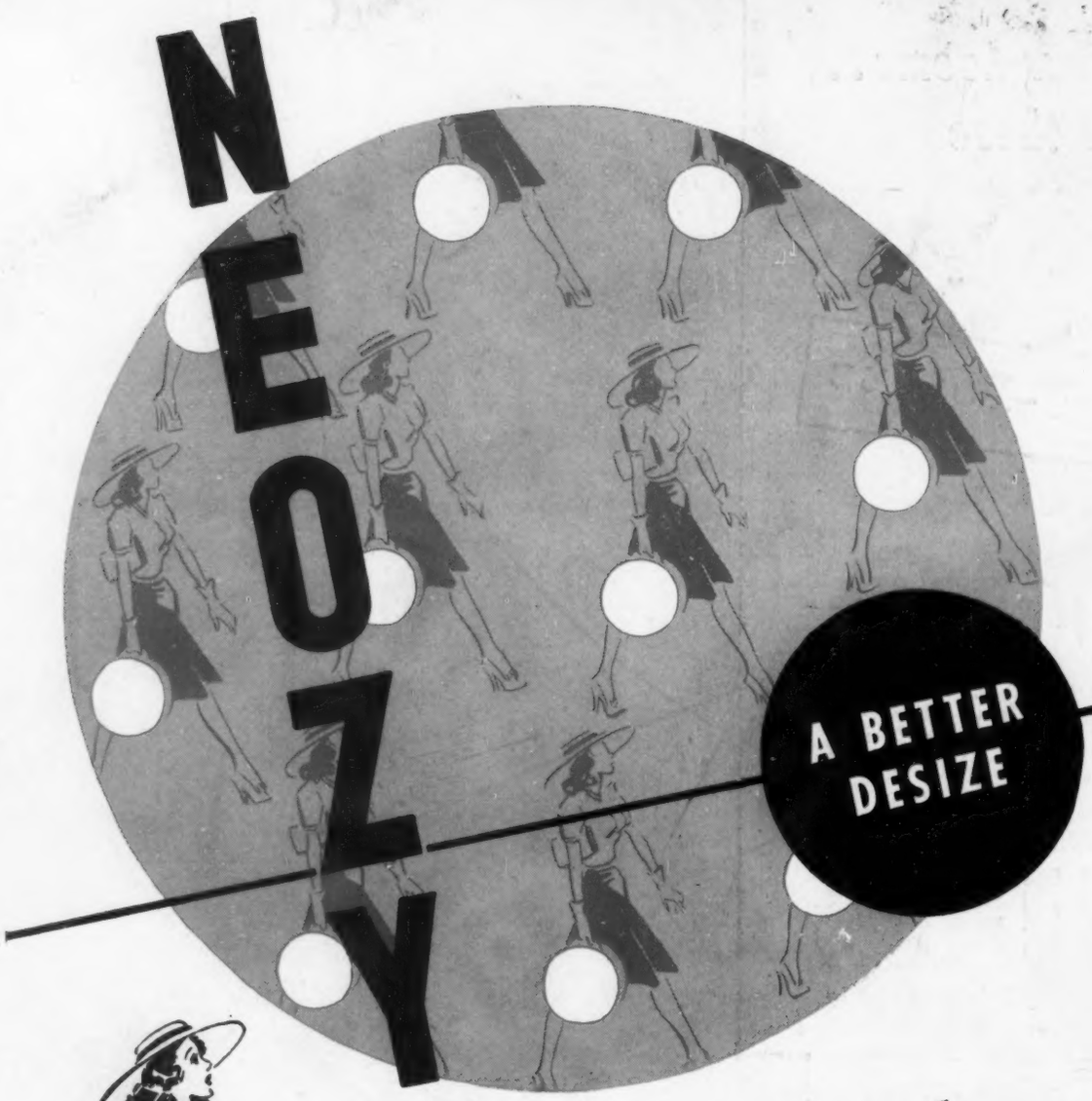

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